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SIXTEENTH CHEMICAL EXPOSITION NUMBER

CHEMICAL ENGINEERING ACHIEVEMENT

For Chemical Exposition Exhibitors and Floor Diagrams
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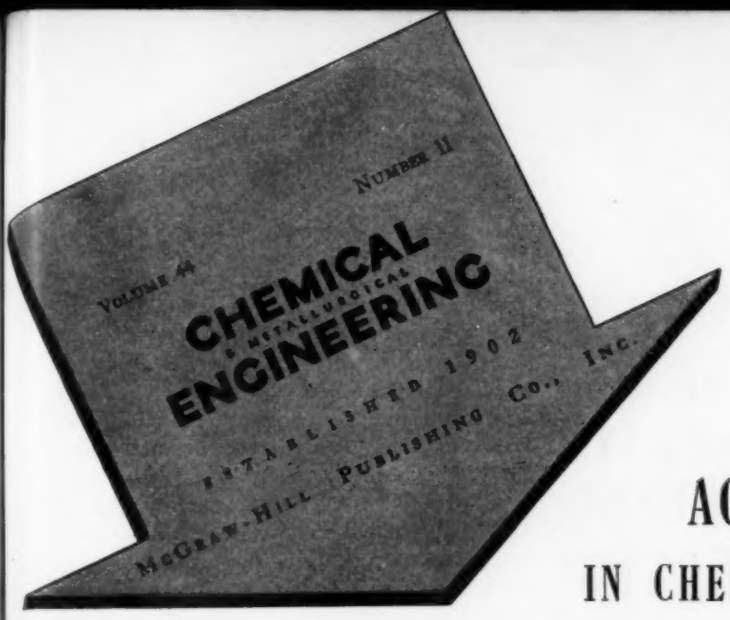


ACHIEVEMENTS
IN CHEMICAL ENGINEERING

CHEMICAL ENGINEERING has come a long way since the last Chemical Exposition. Process industries have made tremendous strides. Some of them have left 1929 far behind. Millions of dollars have been spent for new plants that are literally making over the economic and commercial geography of whole sections of the United States. Witness the parade of pulp and paper plants to the South. Note what cheaper power, as exemplified in the Tennessee Valley, is doing for electrochemical industries. Look at the new all-time high records set in rayon, plastics and petroleum refining.

Less spectacular, but in the aggregate even more important, are the hundreds of ways in which the chemical engineers have increased efficiency through new processes and improvements in the design and performance of equipment. These are developments of vital interest to thousands of chemical engineers and production executives who will be making their biennial pilgrimage to the Chemical Exposition next month. They will have an opportunity to see and talk about these new and better tools which have been developed by their allies—the equipment manufacturers. They will bring their problems with them in the hope that the achievements of others will help them toward their own objectives.

First place in this Sixteenth Chemical Exposition number is given to the outstanding accomplishment of the company which wins the 1937 Award for Chemical Engineering Achievement. Its work, perhaps more than any other, typifies what can be accomplished by an efficient chemical engineering group working toward a single objective—in this case, the large-scale production and utilization of elemental phosphorus. A whole new field of chemistry is laid open for cultivation by process industries.

Other achievements in plant construction have also taught us many lessons that should be recorded and interpreted for future use. A company building a new plant today can take advantage of better design and more efficient construction than were available even a year ago. There has likewise been a profusion of new products that typify important trends. Many of these have been achieved only after years of research and development.

Behind all of this progress is that of the profession itself. A notable effort has been made to strengthen the educational foundations on which our comparatively young profession is being built. These same motives of self improvement have prompted junior engineers in their professional development. And not to be outdone, the older scientific and engineering societies are awakening to their obligations for leadership.

Chemical engineering is making its progress through achievements of the sort which we are proud to present in the pages that follow.

S. D. KIRKPATRICK
EDITOR

NOVEMBER, 1937

HOW TO WIN FRIENDS AND INFLUENCE CHEMICAL ENGINEERS

THIS EDITORIAL is directed primarily to the several hundred manufacturers of equipment and materials who plan to exhibit their products at the 16th Chemical Exposition. It is written on behalf of, and we hope it may be of incidental interest to, some of the many thousands of chemists, engineers and executives who are going to spend some time and money in Grand Central Palace during the week of Dec. 6. These men are coming to New York in search of just two things—new ideas and new contacts.

How are you, as an exhibitor, going to take care of them? Are you going to have a nice booth with comfortable chairs and a pretty girl to pass out souvenirs and flashy advertising "literature"? Are you going to have some striking pictures and showy signs to attract attention in the hope of registering a name that you expect everyone will remember the next time he is in the market for your sort of product? Or are you looking upon the Chemical Exposition as an educational opportunity to present some constructive ideas to the men that can put them to practical use?

If this last is your viewpoint, you have made a start in the right direction. The thing to do now is to follow that through in its logical development. Make sure that the men you send to represent you are your real experts—your engineers who have had most experience with the sort of problems that have proved baffling to your customers. If you've learned better ways to do things or have a better machine for some specific purpose, plan for a definite way of getting that across to your visitors. If your products are really new or if you have made some worthwhile improvements, a practical demonstration may prove interesting and convincing. No amount of showmanship, however, can take the place of stimulating ideas, ably presented by technical men who know what they are talking about.

Someone has likened the human mind to a storage battery that must be recharged occasionally with stimulating ideas. Think what it would mean if every exhibitor were able to contribute even one definitely new and useful idea. To be sure, not every visitor would take away every idea, but enough seed would be planted to assure the bumper crop of chemical engineering developments next year. You, as an exhibitor, can best assure your own future profits by showing others how to make them for themselves. So remember that during the week of Dec. 6, you have just one thing to sell—*ideas!*

HAVING been so generous in contributing our advice to exhibitors who may not need or heed it, we are reminded of some observations that come a little closer home to *Chem. & Met.* readers. Occasionally in these busy days is there a tendency to regard a large exposition as just another chore—a duty to be hurriedly discharged and forgotten. We are all familiar with the man who rushes from one exhibit to another, proud of the fact that he "did the whole show during lunch-hour." When asked for his comments, he will probably tell you, "Oh, it's just the same old stuff! Nothing new but the signboards!" That man is, of course, fooling only himself. He got back just what he put into it. When you are planning your own participation, make sure that you provide ample time to meet and talk with just as many exhibitors as possible. You can benefit from their experience!

NOW, a final word to those who hold the pursestrings or put their okays on engineers' expense accounts. If it is true that chemical engineering ideas are going to be flowing pretty freely in the Grand Central Palace next month, there may be something in the thought that the more men you send the more ideas they will bring back with them. The chances are that you can use the ideas in the next six months, when every effort must be made to offset rising costs of labor and materials. A little time and money spent right now may save you a lot later on. Unless we mis-read the signs, those who wait much longer than next Spring to release their plans for plant expansion and modernization are going to pay higher costs for the privilege of such waiting.

Chemical Engineering Achievement in PLANT CONSTRUCTION

The great forward surge in the building programs of the pulp and paper, rayon, petroleum refining, heavy chemical and other process industries is reaching for a new "all-time high." Two-thirds of the enormous investment in new plants has been in the South which has heretofore depended upon the East and West for its manufactured products. Much of this development below the Mason and Dixon Line is due to the almost explosive expansion in kraft pulp and paper. Many new and interesting materials and methods are being used in plant construction. Glass blocks, stainless steel, windowless buildings and air conditioning are among the features, while acoustical treatment of walls and ceilings is being extended to manufacturing portions of plants.

NEW CONSTRUCTION

Is Changing the Industrial Complexion

MONEY has been plentiful and cheap for several years. Many developments of the depression period have been put into production. New companies have been organized and new plants constructed. The pre-depression equipment, processes and buildings have become more and more obsolete in comparison, consequently competition with the new has grown steadily more difficult. This condition has given so much momentum to the modernization and expansion program that it is rapidly approaching the all-time high established in 1929.

The process industries are accounting for an enormous portion of the program. In the last two years alone they have invested the almost unbelievable sum of $350,000,000 in modern equipment to replace antiquated machinery and in new plants to enlarge production facilities.

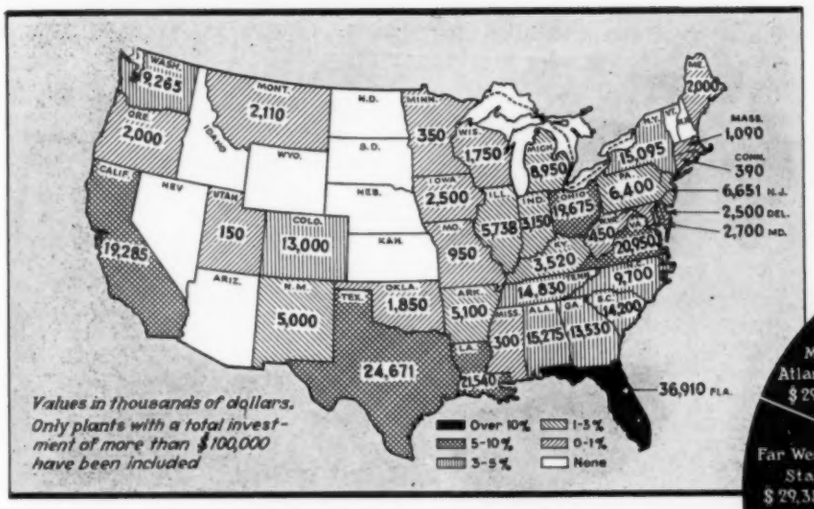
The procession has been led by the pulp and paper industry which has been far out in front with its $138,000,000 in new mills and with a promise of many more for the immediate future. The rayon and transparent wrapping film, petroleum refining, heavy chemicals, coke and manufactured gas, distillery and other industries follow the leader with important programs.

The pulp and paper industry has come from a position at the bottom within a few years to prominence as a leader in industrial development. Today it is second only to steel in rate of expansion with splendid prospects for continued growth. The sudden burst of activity is due to a combination of several compelling forces. The greatest single factor has been the shift from the eastern to the southern states, which constitutes a phase of industrial expansion comparable only to the immediate post-War migration of textile manufacturers from New England. This geographical movement was brought on by an increase in the demand for sulphate at the expense of sulphite paper products and by the recognition by leaders of the lower costs of production in the South.

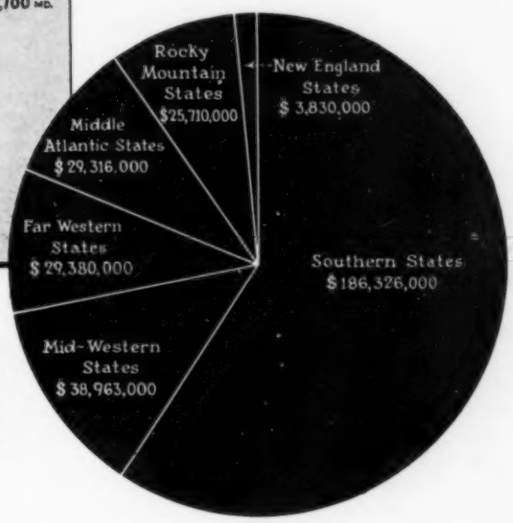
As one executive has been quoted as saying, "There is a great difference in the cost of pulpwood in the South as compared to northern New York. Southern firms are able to buy the wood at the mill for $4.50 a cord; in New York mill owners pay approximately $15 a cord. The growing scarcity and high cost of pulpwood in this section, its slow growth as compared with the rapid reproduction in the South combined with the development in processes to use southern pine, will make it increasingly difficult for the mills in the North to compete particularly in any of the ordinary grades of paper." Another authority, James H. Allen, vice president in charge of the Savannah mill of the Union Bag and Paper Corp., has been quoted as saying that the South will within the next 30 years supply at least 60 per cent of the nation's requirements for pulp and paper.

The increase in production facili-

Fine chemical plant of Merrell Laboratories at Cincinnati. Below—Bleached kraft pulp and paper mill of Champion Paper & Fibre Co. near Houston. This is one of the first of the new group of mills to be built in the South.



A grand total of $350,000,000 has been invested in expansion and modernization of the process industries in 1936-37.



The South is attracting the "lion's share" of the new building program. These figures do not include plants of $100,000 or less.

Construction in the Process Industries in 1936 and 1937

Total investment in new building and equipment in each industry	
Pulp and Paper	$138,000,000
Rayon	49,300,000
Heavy Chemicals	38,500,000
Petroleum Products	32,700,000
Coke and Mfd. Gas	25,200,000
Sugar Refining	11,200,000
Asbestos and Asphalt Prod.	11,000,000
Glass	9,100,000
Distilleries	7,300,000
Lime and Cement	4,200,000
Rubber	3,300,000
Paint and Varnish	2,600,000
Compressed Gases	2,500,000
Soap	2,300,000
Fine Chemicals	1,900,000
Vegetable Oils	1,900,000
Miscellaneous	9,000,000
Total	$350,000,000

ties is also due to a steady increase in per capita consumption of paper products and to the new use as a raw material for viscose and cupra-ammonium rayon. There is also a trend among large consumers that have heretofore depended on foreign pulp to produce their own requirements.

The rayon industry, in which is generally included transparent wrapping film, cellulose acetate plastics and staple fiber, was second in order of magnitude of expansion with an investment of about $50,000,000. Lack of capacity, rather than lack of demand, was the factor which gave the most worry to the rayon industry in this country during the past year or two. It is no novelty to state that both production and consumption established new records during the last calendar year, for with few exceptions they have done so in each of the 25 years since the industry was first started. Rayon has progressed from a production of 121,399,000 lb. in 1929 to 277,626,000 lb. in 1936.

Throughout the world, staple fiber has, in the last few years, suddenly reached a position of great prominence. Although interest in this new fiber lagged in the United States where it is valued chiefly for the interesting novelty effects it gives in combination with other fibers, rather than as a substitute for wool, staple fiber seems to have attained a permanent place and is accounting for a share of the building program. In this connection it is interesting to note that one of the new pulp mills in Florida is being constructed for the purpose of supplying the raw material for staple fiber manufacture.

Cellulose acetate plastic which is closely associated with the acetate rayon branch of the industry has been going steadily forward. Cellophane and the other transparent wrapping films are increasing in popularity. The growing use of this and the other products grouped with rayon has resulted in a building program participated in by every large producer in the country.

Petroleum refining boasts of a large number of chemical engineering achievements in recent years. These new developments have had a tremendously important effect on the methods of refining. They have resulted in the modification of much of the existing refineries and equipment. Among the most important of the revolutionary improvements are the application of solvent extraction, the asphalt precipitation process, the dewaxing processes employing diluents other than naphtha, the catalytic polymerization of refining gases to produce gasoline, etc.

Heavy chemicals too have taken part in the forward surge of industry. The oversold condition of the chlorine market and the increasing consumption of this bleaching agent by the southern pulp and paper industry accounts for the new chlorine plants of the Solvay Process Co. at Baton Rouge, La., of the Southern Alkali Corp. at Corpus Christi, Tex., and of the Columbia Chemical Co. at Barberton, Ohio.

The increasing demand for ethyl gasoline accounts for a new plant producing ethyl fluid at Baton Rouge and for the doubling of the capacity of the Ethyl Dow Chemical Co.'s bromine plant near Wilmington, N. C. Both Monsanto Chemical Co. and Victor Chemical Co. are building phosphorus plants in Tennessee. Krebs Pigment & Color Corp. is constructing a sulphuric acid plant at Baltimore, Continental Carbon Co. a carbon black plant at Sunray, Tex., Atlas Powder Co. a polyhydric

alcohol plant at Wilmington, Del., and Swann & Co. a plant for production of menthol and other specialties at Birmingham, Ala.

The outstanding feature of the entire modernization and expansion program has been the vigorous industrial development in the South. This has been due principally to a resumption of the decentralization movement set in motion shortly before the late business depression. It is almost unbelievable but true that two-thirds of the $350,000,000 appropriated for expansion has been put into plants south of the Potomac and Ohio Rivers. Much of the investment in the pulp and paper, rayon, petroleum refining and heavy chemical industries—the four most active of all the process industries—has been for plants in the South.

The South holds many attractions for industrial development. The area contains approximately one-third the acreage and one-third the population of the United States, but as it is primarily agricultural it is largely dependent on the East and Middle West for manufactured products. Considering the vast market, the tremendously valuable natural resources that cannot be duplicated in any other section of the country, the enormous deposits of salt, sulphur, coal, natural gas, lime, clays, glass sand, petroleum and other materials, and the adequate supply of cheap labor, power, water, excellent transportation facilities and a mild climate, it is undeniable that no area offers greater opportunities to industry than does the South.

The pushing of modernization plans is doing much to build sentiment in favor of decentralization. It is a fact that wage increases can be forced to the point where decentralization of industry will be undertaken at a more rapid rate than has been contemplated heretofore. To a large extent this will mean the establishment of new plants in the South. With its lower scale southern plants will have a competitive advantage. Decentralization of industry is being aided and abetted actively by the Southern States. By offering rent-free buildings and a period of years without taxes these states see an opportunity to balance agriculture with industry.

The Middle West, Middle Atlantic and Far West groups of states were the recipients of a modest amount of new building. The Rocky Mountain States had a slightly smaller share of construction while New England enjoyed almost none of the country's expansion program.

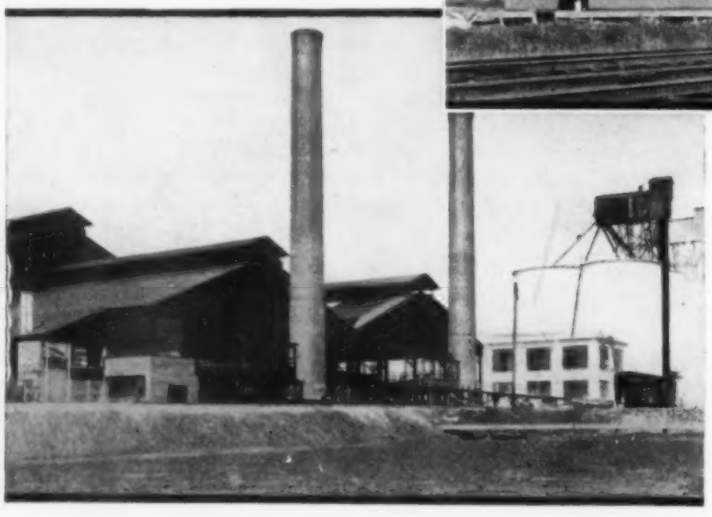
The new plants that have been putting in an appearance all over the country are the last word in design. Many new and interesting materials and methods are being used in their construction. While the industrial building still is a substantial structure of durable material many of the new ones show a trend toward improvement in appearance.

The trend is toward one-story buildings. One large construction company found that for buildings of the same floor space there is about five times more wasted floor space in the multi-story structure, that the required construction time is greater, that the total cost is greater and that the cost of usable floor space is 25 per cent more per square foot. The one-story structures are steel while the higher buildings are generally concrete.

The practice of welding structures was recently given a boost by the adoption of a new building code in New York City which permits the use of welding. Welding makes possible a lighter, stiffer and more compact joint. The same degree of strength may at times be obtained with saving in cost.

The use of welded rigid frame construction has resulted in a new design for single-story industrial buildings, providing broader factory aisles, unobstructed head room to full ceiling height, and maximum uniform daylight throughout.

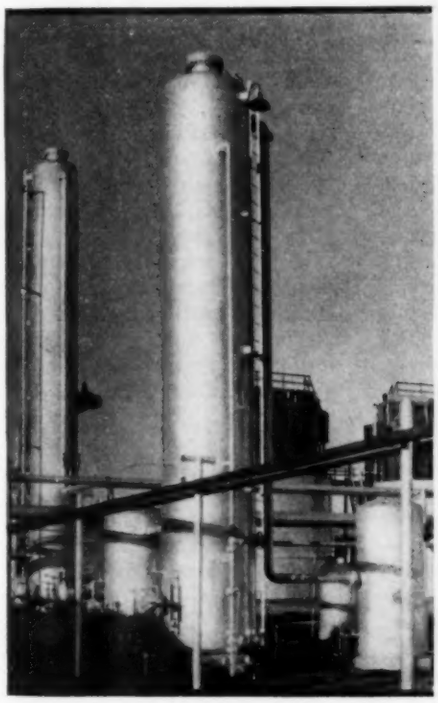
Glass blocks have already exerted a substantial influence in plant design. They are an integral portion

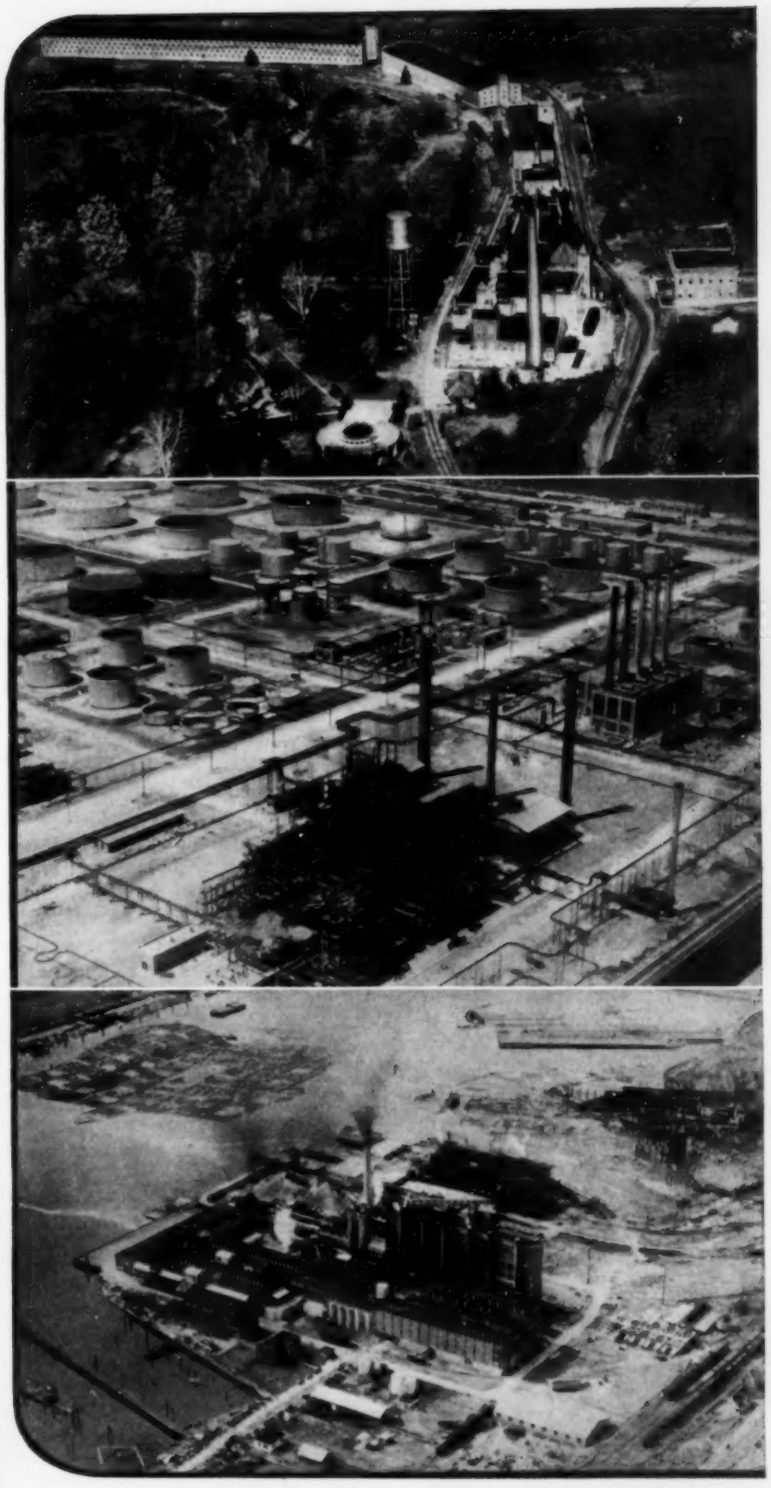


Above—New fertilizer plant of the Eastern States Farmers' Exchange at West Cambridge, Mass. Below—Pittsburgh Plate Glass Co. has built a window glass plant at Henryetta, Okla.

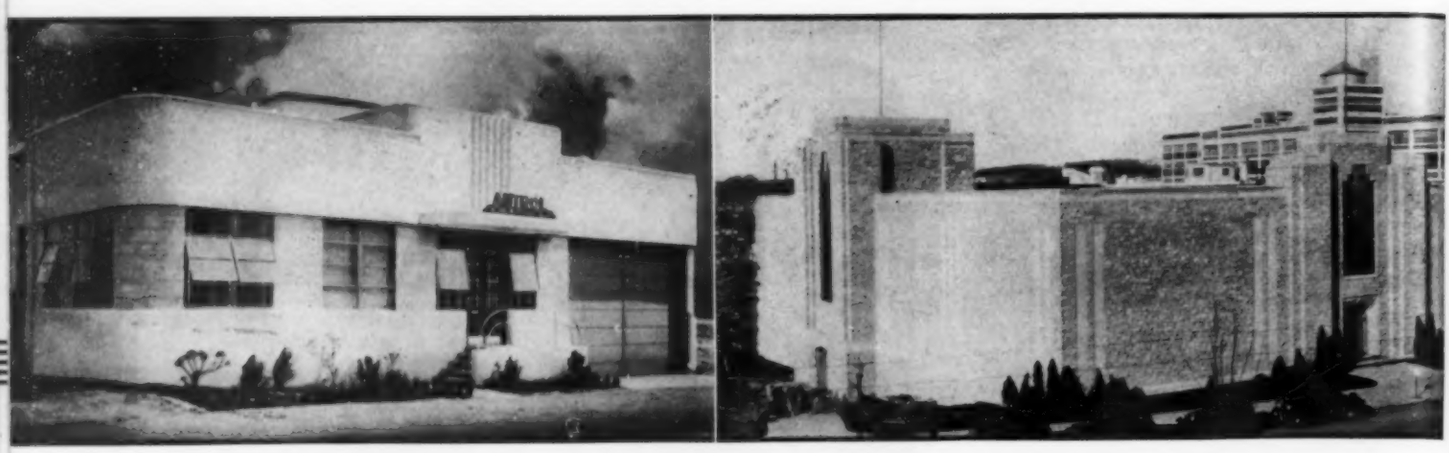
of the wall and are readily adaptable to all vertical lighting sections. They are being used in monitors where the insulating characteristics are an aid to control of temperature and air-conditioning, and permit about 85 to 90 per cent light penetration. No dust or dirt enters the building through the solid wall.

Windowless buildings have been developed in an effort to increase production efficiency. One of the newest of this type was built for the Hershey Chocolate Corp. at Hershey, Pa. Artificial lighting and air conditioning are necessarily a part of this type of structure. One of the principal advantages cited for windowless buildings is that the usual objections to multiple shift operations can be disposed of since maximum efficiency is possible the entire 24 hour day. The result of uniform humidity, constant temperature, and purity of air raises the level of performance and is of direct assistance in maintaining uniform quality of products at all times. It has been stated that in some plants production per employee varies as much as 15 per cent with a 7 per cent change in temperature. Other advantages in this type of building are: improved quality of product, greater accuracy

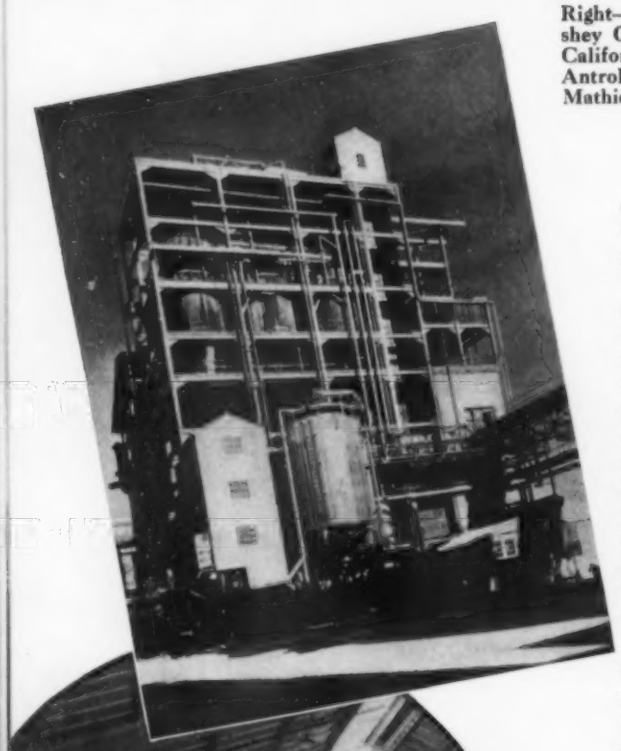




Top—Old Taylor distillery of National Distillers Products Corp. in Woodford Co., Ky., was completely rehabilitated in 1936. Center Pan American Petroleum & Transport Co.'s Texas City, Tex., great cracking unit. Bottom—New extensions to mill of Soundview Pulp Co. at Everett, Wash., has increased capacity from 220 tons to 460 tons per day. Left—New addition to Skelly Oil Co.'s Lyman, Okla., gasoline refinery.



Right—Windowless building of Hershey Chocolate Corp. Left—Typically Californian is the insecticide plant of Antrol Laboratories, Inc. Center—Mathieson Alkali Works' Lake Charles, La., plant has used much open construction in this mild climate. Below—Welded rigid frame construction was used in the Lincoln Electric Co.'s building.



of workers, greater uniformity in materials affected by humidity and closer inspection of products.

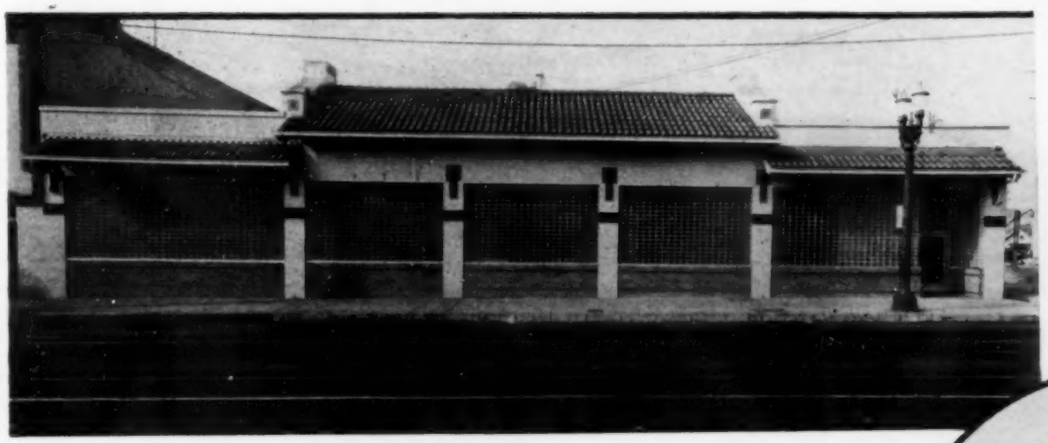
In some cases the use of air conditioning has affected the selection of plant location and in every case special types of roof and wall construction in order to keep heat losses to a minimum and prevent condensation where a relatively high humidity is maintained within the building. In buildings of two or more stories, it is important that sufficient space be allowed between the floor and ceilings of each story to permit the installation of ducts for the movement and distribution of air.

Acoustical treatment of walls and ceilings is now being extended to manufacturing portions of the plant to absorb and reduce the objectionable noise caused by the operation of equipment. The more efficient means of reducing noise is to treat the ceilings, however, treatment of walls offers some little deadening action. Where the wall treatment is advisable, it can be done by the use of porous masonry material, such as haydite block or special plaster or by lining the walls with precast material of high sound absorbing qualities.

The exteriors of the newer buildings meet the growing demand to secure good architectural appearance by the use of simple lines and details predominantly functional and horizontal, rather than by the addition of highly decorative features and ornamental detail. By setting back side wall columns a foot or more inside the exterior walls, it is possible to provide continuous sash in either single or multi-story buildings. The horizontal panes of glass in continuous bands of steel sash accentuate the functional lines.

Brick walls are said to be still the most popular for exterior of industrial buildings because of the availability of good sources of supply throughout the country and the adaptability of brick building design and detail. The light shade of face brick and those with smooth face have the first choice. Because of the insulating value of hollow brick, tile, haydite or other block, they are used for interior courses of masonry walls when air conditioning will be installed.

The advisability of light weight, non-combustible wall materials has brought about the development of panels of standard insulating board with steel sheets attached to each side with mineral plastic. These panels are secured directly to the structural steel frame of the building, and form a smooth exterior and interior wall surface with good insulating qualities. Corrugated steel is used as wall covering where heat loss and appearance are not important factors. This is an inexpensive type of side wall. Glazed tile or brick are used in increasing amounts on the interior walls of power plants, wash and locker rooms, and toilet rooms. Rock wool, cork, glass wool, wood fiber boards, and asbestos products find increased applications as wall insulation.



Left—Glass blocks find useful application in new laboratories of Western Precipitation Co. at Los Angeles. Below — Setback columns provide for installation of continuous horizontal bands of steel sash in the Newark, N. J., plant of Sherwin-Williams Co.

There are several new building roofs. The newly introduced feature in one of these roofs is the relatively simple one of facing monitor windows in all four directions, so as to take better advantage of the vagaries of wind and light. In another case the same basic design is used but the transverse and longitudinal monitors are combined into a continuous "snake" pattern. This design was chosen because the relative narrowness of the building, which had extensive wall areas of glass, reduced the necessity for long lengthwide monitors.

While many new developments have been mentioned briefly, the limited space has made it necessary to omit any reference to an enormous number of other important materials and designs that are new and worthy of serious consideration when planning a new structure.

1936-37 Construction in the Process Industries

Modernization and expansion programs reported or estimated to be greater than $100,000 are listed

Southern States

Company	Plant Location	Principal Products	Estimated Investment
Aluminum Ore Co.	Mobile, Ala.	alumina	$4,000,000
Amer. Cellulose & Chem. Mfg. Co.	Pearisburg, Va.	rayon	10,000,000
American Cyanamid Co.	Valdosta, Ga.		600,000
American Cyanamid Co.	O'Donnell, Tex.	sodium sulphate	200,000
American Cyanamid Co.	Fort Meade, Fla.	phosphates	250,000
American Enka Corp.	Enka, N. C.	rayon	1,200,000
Arkansas-Louisiana Gas Co.	Ruston, La.	gasoline	300,000
Barnsdall Oil Co.	Corpus Christi, Tex.	petroleum products	1,000,000
Bird & Sons	Shreveport, La.	asphalt	200,000
Birmingham Paper Co.	Birmingham, Ala.	paper products	175,000
Brown Paper Mills	Monroe, La.	kraft pulp & paper	150,000
Brunswick Pulp & Paper Co.	Brunswick, Ga.	pulp & paper	3,000,000
Celanese Corp.	Amcelle, Md.	rayon	300,000
Celotex Corp.	Marrero, La.	ins. board, etc.	300,000
Chalmette Refining Co.	Chalmette, La.	petroleum products	400,000
Champion Paper & Fibre Co.	Houston, Tex.	sulphate pulp	7,300,000
Cherokee China Co.	Gordon, Ga.	pottery	500,000
Chesapeake Camp Corp.	Franklin, Va.	sulphate pulp	3,000,000
Columbian Carbon Co.	Corpus Christi, Tex.	carbon black	350,000
Compressed Industrial Gases	Bossier City, La.	gases	150,000
Consolidated Chem. Industries	Ft. Worth, Tex.	chemicals	250,000
Continental Carbon Co.	Sunray, Tex.	carbon black	1,250,000
Continental Oil Co.	Basile, La.	gasoline	250,000
Continental Oil Co.	Ponca City, Okla.	gasoline	200,000
Corpus Christi Ref. Corp.	Corpus Christi, Tex.	refined oil	750,000
Crossett Lumber Co.	Crossett, Ark.	sulphate pulp	4,000,000
Distiller's Corp.-Seagram's Ltd.	Louisville, Ky.	whiskey	1,000,000
E. I. du Pont de Nemours & Co.	Amphill, Va.	cellophane	6,000,000
E. I. du Pont de Nemours & Co.	Baton Rouge, La.	ethyl fluid	5,000,000
E. I. du Pont de Nemours & Co.	Bellewood, Va.	carbon bisulphide	750,000
E. I. du Pont de Nemours & Co.	Baltimore, Md.	sulphuric acid	2,000,000
Eastern States Petroleum Co.	Houston, Tex.	gasoline	300,000
Ethyl-Dow Co.	Wilmington, N. C.	bromine	1,000,000
Fernandina Pulp & Paper Co.	Fernandina, Fla.	sulphite pulp	6,300,000
Fidelity Products Co.	Harlingen, Tex.	cotton seed oil	150,000
Frankfort Distilleries	Louisville, Ky.	whiskey	180,000
Freeport Sulphur Co.	Grande Ecaille, La.	sulphur	300,000
George W. Fraser	Galveston, Tex.	cotton seed oil	450,000
Gaylord Container Corp.	Bogalusa, La.	sulphate pulp	400,000
Goodyear Tire & Rubber Co.	Gadsden, Ala.	automobile tires	200,000
Great National Oil Corp.	Shreveport, La.	gasoline	200,000
Gulf Oil Corp.	Port Arthur, Tex.	gasoline	300,000
Gulf Fiber Co.	Houston, Tex.	fiber products	200,000
Gulf Portland Cement Co.	Houston, Tex.	cement	400,000
Gulf Refining Co.	Kermit, Tex.	carbon black	200,000
Gulf Refining Co.	Wickett, Tex.		426,000
Hercules Powder Co.	Brunswick, Ga.	naval stores	150,000
Hollingsworth & Whitney Co.	Mobile, Ala.	sulphate pulp	5,000,000
Humble Oil & Refining Co.	Baytown, Tex.	petroleum products	450,000
Humble Oil & Refining Co.	Ingleside, Tex.	petroleum products	250,000
Hunter Baltimore Pure Rye Distillery	Gwynnbrook, Md.	rye whiskey	200,000
Iberia Sugar Cooperative	New Iberia, La.	sugar	700,000
Johns-Manville Corp.	Marrero, La.	asbestos and rfg.	750,000
Keasbey & Mattison Co.	St. Louis, Mo.	asbestos paper	500,000
Kentucky Sour Mash Distillery Co.	Owensboro, Ky.	whiskey	140,000
Kieckhefer Container Co.	Plymouth, N. C.	paper containers	4,500,000
Kraft Corp. of America	Fernandina, Fla.	sulphate pulp	7,000,000
Laurens Glass Works	Laurens, S. C.	glass	200,000
Linde Air Products Co.	Norfolk, Va.	acetylene	
Magnolia Sugar Coop., Inc.	Houma, La.	sugar	180,000
Masonite Corp.	Laurel, Miss.	insulating board	150,000
McMillan & McMillan	Arkadelphia, Ark.	sulphate pulp	500,000
Mead Corp.	Kingsport, Tenn.	paper	2,610,000
C. W. Meyer	Stone Mountain, Ga.	glass	2,000,000
Monsanto Chemical Co.	Monsanto, Tenn.	phosphates	500,000
National Container Corp.	Jacksonville, Fla.	sulphate pulp	3,360,000
National Dist. Products Corp.	Woodford City, Ky.	bourbon whiskey	1,000,000
National Dist. Products Corp.	Woodford City, Ky.	bourbon whiskey	600,000
National Gypsum Co.	Mobile, Ala.	insulating board	2,000,000
National Oil Products Co.	Cedartown, Ga.	petroleum products	1,000,000
National Tire & Rubber Co.	Elizabethtown, Tenn.	rubber tires	220,000
Nelson County Distillery, Inc.	Greenbrier, Ky.	distillery	150,000
North American Rayon Corp.	Elizabethtown, Tenn.	rayon	2,500,000
Octane Oil & Ref. Co.	Cotton Valley, La.	petroleum products	500,000
Orange Pulp & Paper Co.	Orange, Tex.	kraft papers	1,500,000
Pan American Refining Corp.	Texas City, Tex.	gasoline	
Parade Gasoline Co.	Henderson, Tex.	gasoline	275,000
Pelican Oil & Gasoline Co.	Rodessa, La.	gasoline	200,000
Penfield Co.	Frankfort, Ky.	whiskey	300,000
Phillips Petroleum Co.	Oklahoma City, Okla.	gasoline	200,000
Phillips Petroleum Co.	Odessa, Tex.	gasoline	110,000
Phillips Petroleum Co.	Edmond, Okla.	gasoline	200,000
Pontiac Refining Corp.	Dallas, Tex.	gasoline	300,000
Pure Oil Co.	Muskogee, Okla.	gasoline	1,000,000
Riegel Paper Corp.	Acme, N. C.	sulphate pulp	3,000,000
Ruberoid Co.	St. Louis, Mo.	roofing	250,000
Ruberoid Co.	Mobile, Ala.	asphalt prod.	200,000
Shell Petroleum Corp.	Houston, Tex.	petroleum products	500,000
Shell Petroleum Corp.	Norco, La.	petroleum products	750,000
Shoreline Oil Co.	Lewis, La.	gasoline	200,000
Sinclair Prairie Co.	Moore County, Tex.	gasoline	200,000
Skelly Oil Co.	Lyman, Okla.	solvents	250,000

Company	Plant Location	Principal Products	Estimated Investment
Socony Vacuum Oil Co.	St. Louis, Mo.	gasoline	200,000
Solvay Process Co.	Baton Rouge, La.	chlorine	1,000,000
Sonoco Products Co.	Hartsville, S. C.	paper products	500,000
Southern Alkali Corp.	Corpus Christi, Tex.	chlorine	1,000,000
Southern Cotton Oil Co.	Harlingen, Tex.	cotton seed oil	150,000
Southern Kraft Corp.	Georgetown, S. C.	sulphate pulp	8,000,000
Southern Kraft Corp.	Camden, Ark.	sulphate pulp	600,000
Southern Kraft Corp.	Springhill, La.	sulphate pulp	6,000,000
Southern States Coop. Fertilizer Service	Baltimore, Md.	fertilizer	200,000
Southland Paper Mills, Inc.	Lufkin, Tex.	newsprint	5,000,000
Standard Oil Co. of La.	Baton Rouge, La.	petroleum products	3,300,000
St. Joe Paper Co.	Port St. Joe, Fla.	sulphate pulp	10,000,000
Swann & Co.	Birmingham, Ala.	menthol, etc.	1,000,000
Swift & Co.	Houston, Tex.	cottonseed oil	150,000
Talco Pipe Line Co.	Mt. Pleasant, Tex.	gasoline	550,000
Tenn. Coal, Iron & R. R. Co.	Fairfield, Ala.	coke, byproducts	2,000,000
Tennessee Eastman Corp.	Kingsport, Tenn.	acetate fiber	8,000,000
Tips Glass Co.	Houston, Tex.	glass containers	500,000
Tubize Chatillon Corp.	Rome, Ga.	rayon	2,800,000
Union Bag & Paper Corp.	Savannah, Ga.	sulphate pulp, etc.	3,000,000
Universal Atlas Cement Co.	Birmingham, Ala.	cement	1,500,000
U. S. Gypsum Co.	Greenville, Miss.		150,000
Victor Chemical Works	Mt. Pleasant, Tenn.	phosphorus	1,000,000
Virginia Carolina Chem. Corp.	Birmingham, Ala.		200,000
Viscose Corp.	Front Royal, Va.	rayon	1,000,000
J. E. Wathen Distilling Co.	Uniontown, Ky.	whiskey	150,000
West Virginia Pulp & Paper Co.	Charlestown, S. C.	sulphate pulp, etc.	5,000,000

Middle Western States

Aluminum Co. of America	Lafayette, Ind.	extruded al. products	.....
American Cyanamid Co.	Joliet, Ill.	sulphuric acid	$250,000
Braden Sutphin Ink Co.	Cleveland, Ohio	ink	125,000
Burroughs Adding Machine Co.	Detroit, Mich.	paper specialities	3,000,000
Burroughs Adding Machine Co.	Plymouth, Mich.	roll paper	250,000
Colgate-Palmolive Peet Co.	Jeffersonville, Ind.	soap	200,000
Columbia Chemical Co.	Barberton, Ohio	chlorine plant	750,000
Container Co.	Defiance, Ohio	paper containers	200,000
Container Co.	Van Wert, Ohio	fiber boxes	200,000
Container Corp. of America	Carthage, Indiana	paper boxes	225,000
Corn Products Refining Co.	Pekin, Ill.	corn sugar	2,000,000
Dixie Refining Co.	Trenton, Mich.	gasoline	1,000,000
Dow Chemical Co.	Midland, Mich.	chemicals	1,000,000
Firestone Tire & Rubber Co.	Wyandotte, Mich.	rubber products	1,000,000
Flintkote Co.	Chicago Heights, Ill.		250,000
General Electric Co.	Niles, Ohio	glass factory	300,000
Gillette Rubber Co.	Eau Claire, Wis.	rubber factory	.....
Gold Seal Asphalt Rfg. Co.	Chicago Heights, Ill.	asphalt roofing	225,000
Goodrich Tire & Rubber Co.	Akron, Ohio	rubber products	150,000
Goodyear Tire & Rubber Co.	Jackson, Mich.	rubber tires	1,000,000
Harshaw Chemical Co.	Cleveland, Ohio		250,000
Indiana Farm Bureau Coop. Assn.	Indianapolis, Ind.		125,000
Industrial Rayon Corp.	Painesville, Ohio	rayon	8,000,000
Industrial Rayon Corp.	Cleveland, Ohio	rayon	2,750,000
Johns-Manville Corp.	Waukegan, Ill.		273,000
Johns-Manville Corp.	Richmond, Ind.	low temp. insulation	.....
Kalamazoo Vegetable Parchment Co.	Parchment, Mich.	paper specialities	250,000
Kimberley-Clark Corp.	Neenah, Wis.	heavy paper, etc.	500,000
Libby-Owens-Ford Glass Co.	Toledo, Ohio	glass	450,000
Libby Glass Co.	Toledo, Ohio	glass	500,000
Eli Lilly & Co.	Indianapolis, Ind.	pharmaceuticals	300,000
Marathon Paper Mills Co.	Menasha, Wis.	paper products	120,000
Mead Johnson Co.	Evansville, Ind.	pharmaceuticals	150,000
W. S. Merrell Co.	Cincinnati, Ohio	pharmaceuticals	800,000
Morris Paper Mills	Novis, Ill.	paper products	110,000
National Adhesives Corp.	Chicago, Ill.	adhesives	155,000
National Biscuit Co.	Marseilles, Ill.	cartons for prod.	850,000
National Cylinder Gas Co.	Ferndale, Mich.	oxygen, acetylene	125,000
National Glass Co.	Trenton, Mich.	glass	500,000
National Refining Co.	Findlay, Ohio		200,000
Newberry Lumber & Chem. Co.	Newberry, Mich.	acetic acid	125,000
Nubian Paint & Varnish Co.	Chicago, Ill.	paint and varnish	125,000
Old Dutch Refining Co.	Muskegon, Mich.		200,000
Owen-Illinois Glass Co.	Newark, Ohio	glass	350,000
Pittsburgh Plate Glass Co.	Barberton, Ohio	chemicals	150,000
Pittsburgh Plate Glass Co.	Milwaukee, Wis.	varnish	180,000
Pittsburgh Plate Glass Co.	Dayton, Ohio	varnish	400,000
Penn Maryland Corp.	Cincinnati, Ohio	whiskey	250,000
Petroleum Chemical Co.	Grand Haven, Mich.	petroleum products	300,000
Procter & Gamble, Inc.	Cincinnati, Ohio	soap	750,000
Pure Oil Co.	Toledo, Ohio	gasoline and oils	750,000
Reilly Tar & Chemical Corp.	Cleveland, Ohio	coal tar products	200,000
River Raisin Paper Co.	Monroe, Mich.	paper	200,000
Schenley Corp.	Lawrenceburg, Ind.	whiskey	800,000
Joseph H. Seagram & Sons	Lawrenceburg, Ind.	whiskey	350,000
Sherwin-Williams Co.	Cleveland, O.	paint	500,000
Sherwin-Williams Co.	Chicago, Ill.	paint	500,000
Standard Oil of Ohio	Toledo, Ohio	cracking unit	1,500,000
U. S. Glass Co.	Tiffin, Ohio		150,000
Hiram Walker & Sons, Inc.	Peoria, Ill.		.....
Wisconsin Gas & Elec. Co.	Racine, Wis.	gas	400,000
Wisconsin Power & Light Co.	Fond du lac, Wis.		150,000

Middle Atlantic States

Air Reduction Sales Co.	Jersey City, N. J.		$200,000
Atlas Powder Co.	Wilmington, Del.	polyhydric alcohols	2,500,000
Bradford Oil Refining Co.	Bradford, Pa.	gasoline	500,000
Chemical Lime Co.	Bellefonte, Pa.	lime	500,000
Ciba Pharm. Products, Inc.	Summit, N. J.	pharmaceuticals	500,000
Celotex Corp.	Metuchen, N. J.	insulating board	1,000,000
Corning Glass Works	Corning, N. Y.	glass factory	500,000
Duplate Corp.	Creighton, Pa.	glass	225,000

Company	Plant Location	Principal Products	Estimated Investment
E. I. du Pont de Nemours & Co.	Niagara Falls, N. Y.	chemicals	.....
E. I. du Pont de Nemours & Co.	Philadelphia, Pa.		175,000
Eastman Kodak Co.	Rochester, N. Y.	Kodachrome film	400,000
Flintkote Co.	Rutherford, N. J.	roofing and asphalts	750,000
Frontier Fuel Oil Co.	Buffalo, N. Y.	fuel oil	150,000
General Aniline Works	Grasselli, N. J.	dyes and dyestuffs	.....
General Plastics, Inc.	N. Tonawanda, N. Y.	synthetic resins	435,000
Gladfelter (P. H.), Co.	Spring Grove, Pa.	soda pulp	500,000
Hambleton Terminal Corp.	Tonawanda, N. Y.	gasoline	280,000
Hammermill Paper Co.	Erie, Pa.	paper	500,000
Hanna Furnace Corp.	Buffalo, N. Y.	coke	6,000,000
Johns-Manville Corp.	Manville, N. J.	asbestos products	1,200,000
Kimberly-Clark Corp.	Niagara Falls, N. Y.	paper	300,000
Keasbey & Mattison Co.	Ambler, Pa.	asbestos paper	700,000
Keasbey & Mattison Co.	New Brunswick, N. J.	asbestos paper	350,000
Heyden Chemical Corp.	Garfield, N. J.	chemicals	.....
Kimble Glass Co.	Vineland, N. J.	glass	200,000
Linde Air Products Co.	Mifflin Township, Pa.		.....
Linde Air Products Co.	Tonawanda, N. Y.		1,000,000
Mathieson Alkali Works, Inc.	Niagara Falls, N. Y.	ammonia	.....
Meadville Distillery Co., Inc.	Meadville, Pa.	whiskey	300,000
Municipality	Jamestown, N. Y.	gas plant	1,500,000
National Auto. Fibers, Inc.	Little Falls, N. Y.	fiber products	150,000
National Gypsum Co.	Buffalo, N. Y.	wall board	900,000
National Gypsum Co.	Buffalo, N. Y.	plaster	400,000
National Paper Products Co.	Carthage, N. Y.	tissue paper	150,000
Owens Illinois Glass Co.	Huntington, W. Va.	glass	250,000
Pennsylvania Glass Bottle Co.	Sheffield, Pa.	glass bottle	200,000
Pittsburgh-Corning Corp.	Port Allegheny, Pa.	glass brick	150,000
Pittsburgh Plate Glass Co.	Newark, N. J.	glass	106,000
Rushmore Paper Mills	Gouverneur, N. Y.	paper products	250,000
Scott Paper Co.	Chester, Pa.	paper products	1,250,000
Solvay Process Co.	Solvay, N. Y.		500,000
Sonoco Products Co.	Garwood, N. J.	paper board	500,000
Springfield Coated Paper Corp.	Jersey City, N. J.	coated paper	125,000
Standard Oil of N. J.	Bayway, N. J.	petroleum products	170,000
Universal Atlas Cement Co.	Hudson, N. Y.	cement	1,000,000
U. S. Glass Co.	Pittsburgh, Pa.	glass	150,000
Waverly Oil Works Co.	Pittsburgh, Pa.	petroleum products	.....
W. Va. Farm Bureau Lime Com.	Morgantown, W. Va.	lime	200,000
Viscose Corp.	Marcus Hook, Pa.	rayon	200,000

Far Western States

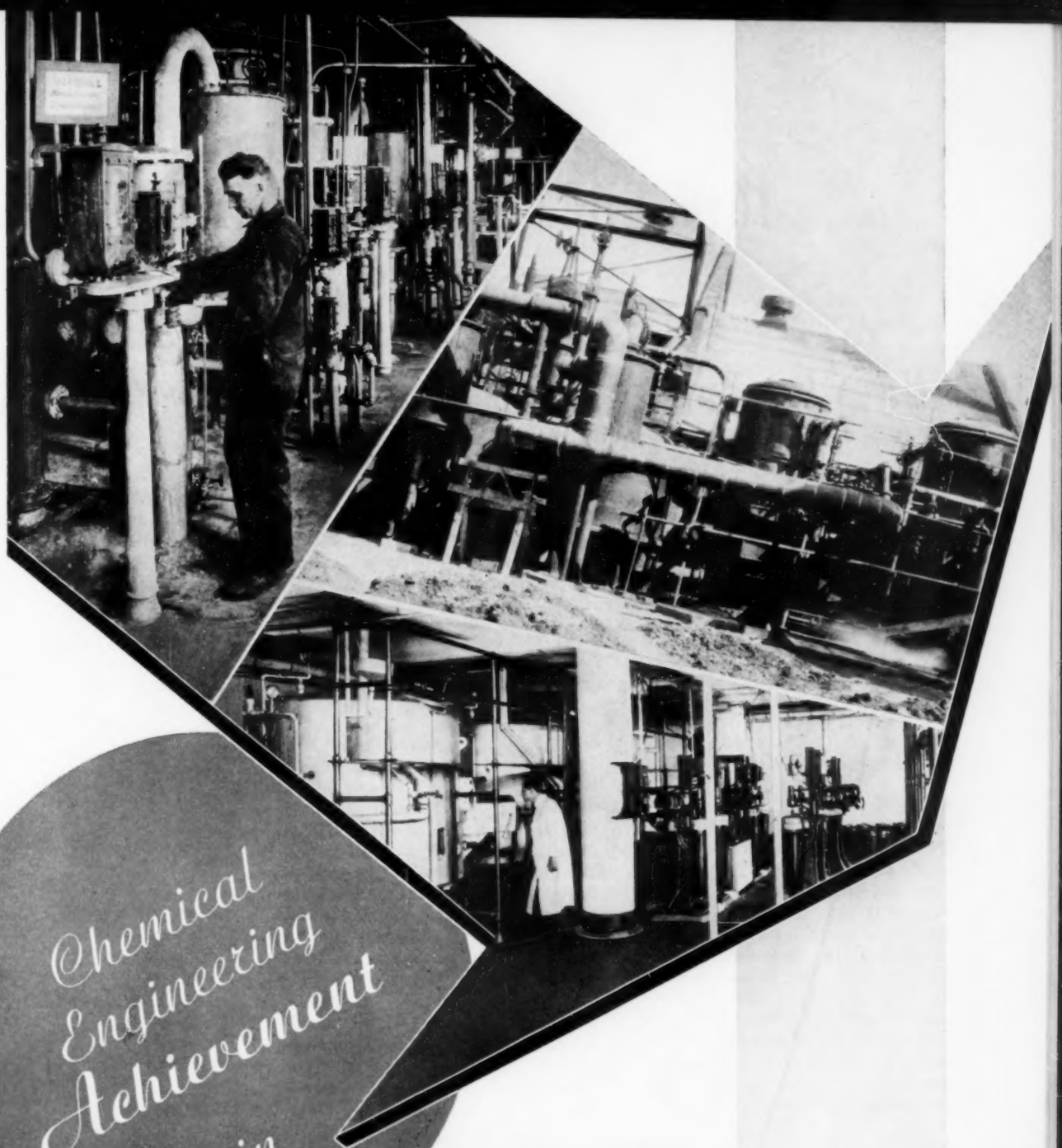
Aluminum Co. of America	Los Angeles, Calif.	cast al. products	.....
Amalgamated Sugar Co.	Nyssa, Ore.	sugar	$2,000,000
Armstrong Cork Co.	South Gate, Calif.	insulating board	1,000,000
California Chemical Co.	Newark, Calif.		1,000,000
General Paint Corp.	Seattle, Wash.	paint	110,000
General Petroleum Corp.	Torrance, Calif.	petroleum products	600,000
Grays Harbor Pulp & Paper Co.	Hoquiam, Wash.	sulphate pulp	150,000
Hooker Electrochemical Co.	Tacoma, Wash.		110,000
Johns-Manville Corp.	Los Angeles, Calif.	rock wool	1,000,000
Liquid Carbonic Corp.	San Francisco, Calif.	CO_2 dry ice	250,000
Owens Illinois Pac. Coast Co.	Oakland, Calif.	glass	1,000,000
Pioneer Flintkote Co.	Los Angeles, Calif.	box board	1,000,000
Procter & Gamble, Inc.	Long Beach, Calif.	soap	1,000,000
Puget Sound Pulp & Timber Co.	Bellingham, Wash.	sulphite pulp	1,100,000
Puget Sound Pulp & Timber Co.	Anacortes, Wash.	sulphite pulp	600,000
Rainier Pulp & Paper Co.	Shelton, Wash.	sulphate pulp	500,000
Richfield Oil Co.	Watson, Calif.		4,000,000
Santa Cruz Oil Co.	Alameda, Calif.	veg. oil products	500,000
Schmidt Lithograph Co.	San Francisco, Calif.	coated papers	250,000
Seattle Gas Co.	Seattle, Wash.	gas plant	500,000
Shaffer Pulp Co.	Tacoma, Wash.	sulphite pulp	125,000
Shell Oil Co.	San Francisco, Calif.	petroleum products	250,000
Soundview Pulp Co.	Everett, Wash.	sulphite pulp	3,800,000
Spencer-Kellogg & Sons	Long Beach, Calif.	linseed oil	150,000
Spreckels Sugar Co.	Woodland, Calif.	sugar	1,500,000
St. Regis Kraft Co.	Tacoma, Wash.	sulphate pulp	600,000
Tidewater Assoc. Oil Co.	Avon, Calif.	gasoline	1,500,000
Three-G Distillery Corp.	Burbank, Calif.	whiskey	110,000
Union Oil Co.	Oleum, Calif.	gasoline	1,500,000
U. S. Gypsum Co.	Los Angeles, Calif.	building papers and felt	175,000
Utah Idaho Sugar Co.	Toppenish, Wash.	beet sugar	.....

Rocky Mountain States

American Smelting & Refining Co.	Garfield, Utah	sulphur	$150,000
Climax Molybdenum Co.	Climax, Colo.	molybdenum	350,000
Colo. Fuel & Iron Co.	Pueblo, Colo.	coke	12,000,000
Continental Oil Co.	Denver, Colo.	gasoline and oil	.....
E. I. du Pont de Nemours & Co.	Ft. Madison, Iowa	paints and enamels	.....
E. I. du Pont de Nemours & Co.	Clinton, Iowa	cellophane	5,000,000
Holly Sugar Corp.	Hardin, Mont.	sugar	1,500,000
Holly Sugar Corp.	Colo. Springs, Colo.	beet sugar	250,000
Minn. Mining & Mfg. Co.	St. Paul, Minn.	abrasive papers	350,000
National Gypsum Co.	Fort Dodge, Iowa	wallboard	500,000
Nevada Cons. Copper Co.	Hurley, N. M.		5,000,000
Northwest Refining Co.	Cut Bank, Mont.		500,000
Ohio Oil Co.	Medicine Bow, Mont.		110,000

New England States

Boston Blacking & Chemical Co.	Cambridge, Mass.	chemicals	$300,000
Dewey & Almy Chemical Co.	Cambridge, Mass.	chemicals	140,000
Eastern States Farmers' Exchange	W. Cambridge, Mass.	fertilizers	500,000
Great Northern Paper Co.	Mallinocket, Me.	newsprint	2,000,000
New Haven Pulp & Paper Co.	New Haven, Conn.	paper products	250,000
Ponds Extract Co.	Clinton, Conn.	soap and cosmetics	140,000
Smith Paper, Inc.	Lee, Mass.	paper stocks	150,000



Chemical Engineering Achievement in EQUIPMENT AND CONSTRUCTION MATERIALS

In the following nineteen pages many of the new developments in production and packaging equipment and construction materials which are to be exhibited at the 16th Exposition of Chemical Industries are described in brief, the majority of them for the first time. Not simply a list of exhibits, this Preview is a panorama of some 200 developments that are new since the last Chemical Show in 1935. Those engineers who will attend the Exposition should find it of assistance in guiding their attention to the things that they will find most interesting. For those who cannot attend, it should in some measure offset this misfortune.

16th CHEMICAL EXPOSITION PREVIEW OF New Equipment and Construction Materials

This Preview is based on information supplied to us by about 100 of the exhibitors, regarding new developments of the last two years which are to be shown at the 16th Exposition of Chemical Industries. Since many exhibitors had not fully settled the features of their booths when this account was prepared, our December number will fill in the gaps with descriptions of other new developments that are to be disclosed at the Show when it is held in New York during the week of December 6.

CENTRIFUGALS, FILTERS AND DUST COLLECTORS

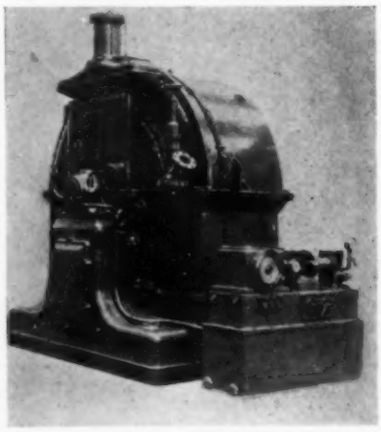
AMONG the several developments in centrifugal separation equipment to be exhibited at the Exposition is a machine new to the American market, the Baker Perkins-ter Meer automatic centrifugal, built by Baker Perkins Co., Saginaw, Mich. This is built in extremely large sizes, using either perforated or imperforate baskets for centrifugal filtering and clarification. This machine is of the type in which an inclosed basket rotating continuously on a horizontal shaft is charged and discharged at intervals by automatic means, controlled by an hydraulically operated timing system. Drums vary in diameter from 50 to 98 in., while special machines are available with holding capacities up to 120 cu. ft. The solid basket type is made in two forms, the conventional overflow type suitable for the majority of applications and a skimming type for light, extremely flocculent solids. In the latter a charge of material is run into the imperforate basket, sufficient to fill it. Within a few seconds, the liquid attains the speed of the basket and unhindered settling of the solids takes place. Then a skimmer pipe is brought into action to remove the clarified liquid.

Complete redesign of the two types of continuous centrifugal to be shown in its booth has been announced by the Bird Machine Co., South Walpole, Mass. The solid bowl machine is used for deliquoring solids or clarifying liquors, as well as for classifying solids according to particle size. Recent applications have been in pigments, cement, chemicals, and non-metallic mineral sludges. The filtering type centrifugal is being used for the continuous separation of crystalline or granular solids. Washing is possible. This type is being used for such materials as sodium chloride, sulphate, and phosphate, and ferrous sulphate.

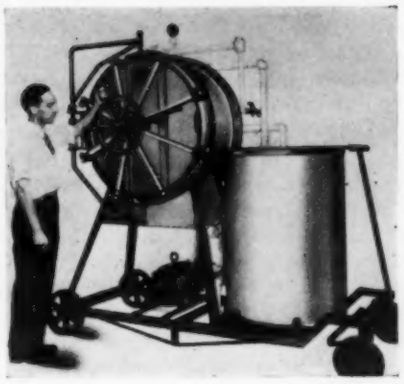
A new 12-in. centrifugal extractor of its "Standard" line is to be shown by the Fletcher Works, Philadelphia, Pa. The machine is of the underdriven type with a welded steel curb, a tinned, spun-copper basket (or Monel metal, if desired), an aluminum safety cover and a foot brake. A vertical motor and V-belt drive are employed.

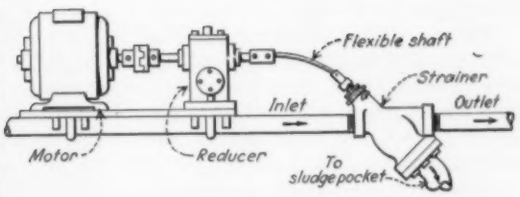
Sharples Specialty Co., Philadelphia, Pa., has recently put into production and will exhibit a new ultra centrifuge licensed under the Svedborg-Nickels patent for lower speed machines. It is used for small samples of liquid under a centrifugal force up to 250,000 times gravity. The rotor is supported on an air bearing in a high vacuum. Material placed in the cells of the rotor is viewed by a camera. A stroboscope

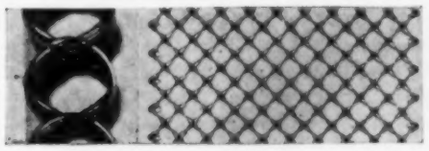
Baker Perkins-ter Meer centrifugal



Bird solid-bowl centrifugal in a clay plant

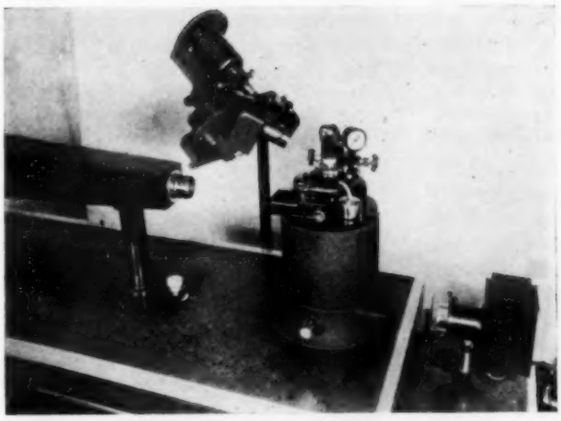


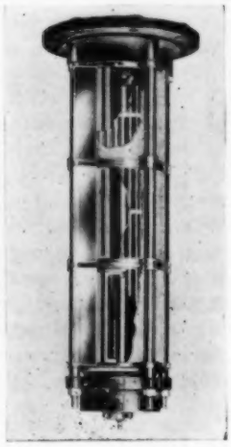




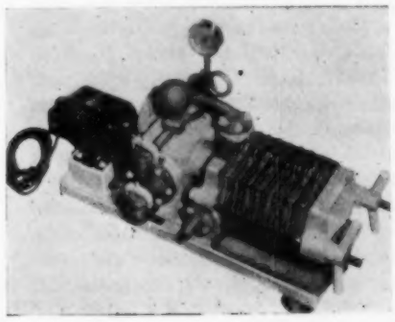
Above: Seitz Tank Hercules
Upper Left: Fletcher centrifugal
Left: Sharples ultra centrifuge

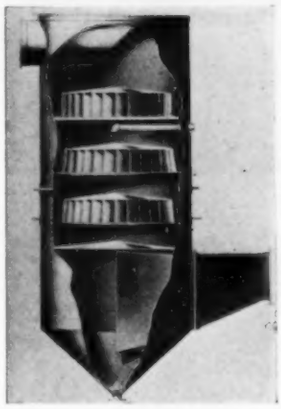
Above: Spiral matrix fabric
Top: Sarco strainer
Below: Shriver portable filter



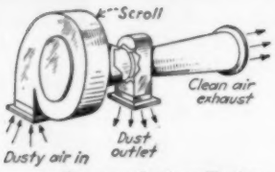


Cuno back-washing filter





Schnelble Junior dust collector



Bowen dust collector

is provided for measuring the speed of rotation. Rayon and dye manufacturers are stated already to be using such equipment for production control and determination of the particle size of colloids.

Five of the centrifugals to be shown by the Tolhurst Division of American Machine & Metals, Inc., New York, will be new or improved. Both the Suspended and Center Slung machines are employing new fabricated steel cases. The latter is available in a new 30-in. heavy-duty model for batch operation, equipped with a fume cover. A new chain link suspension is being used for the Solid Curb type.

Several new developments in filters and filter accessories will be on display. Two new machines will be in the booth of the American Seitz Filter Corp., New York. One is a pressure leaf filter of the "alluvial" type, known as the Seitz Tank Hercules, and intended for clarifying such liquids as varnishes, oils and soaps. The filter consists of a cylindrical tank within which are filter leaves of Monel metal screen. These are coated with a specially treated asbestos or other filtering material floated on to the leaves from suspension in a small amount of the material to be filtered. Supports are provided on which the leaves may be run out of the tank for stripping exhausted asbestos. The filter is built either alone or as a complete unit consisting of filter, mixing tank, pump and motor, on a movable carriage.

A second new development of this company is a hard rubber and stainless steel acid-proof filter for clarification and sterilization. Hard rubber used for the plates is stated to withstand high temperatures (even steaming) without danger of warping. A wire-wound filter arranged for automatic backwashing with a portion of the cleaned liquid will be shown by the Cuno Engineering Corp., Meriden, Conn. Its principal field is in the removal of abrasive particles from such liquids as water, soap, heavy oils and greases. Cleaning of the filter is accomplished by a motor slowly revolving the filter cartridge so that each portion of the surface passes momentarily over a backwash nozzle supplied with clean liquid under pump pressure. This liquid is returned to the system and consequently there is no washing loss.

In addition to its regular line of filter aids, the Dicalite Co., New York, will have on display and demonstrate three new filter aids, Dicalite 20, 40 and 4200. These new materials, recently developed at the company's Oregon operations, supplement the regular line, giving higher speed filtration and comparable clarity.

A woven glass filter cloth known

as Fiberglas is a new development of the Filter Media Corp., Irvington-on-Hudson, N. Y., in conjunction with the Owens-Illinois Glass Co. It is available in a wide variety of styles and in any width suitable for industrial filtration. Samples will be exhibited by both companies.

A new backing and supporting fabric for dust collector bags, filter cloths, and dialyzing membranes, known as Interwoven Spiral Matrix fabric, will be shown by Korb-Pettit Wire Fabrics & Iron Works, Philadelphia, Pa. An accompanying illustration shows two views of this fabric which is said to give rigid equalized contact points, yet permits breathing or pulsating action and quick drainage.

Continuous removal of solids from liquids, particularly those of high viscosity, is the function of a new motor operated scraper strainer to be shown by the Sarco Co., New York. As shown in the sketch, a spiral scraper operated by a motor through a flexible shaft continuously removes accumulated solids. Installation can be made in the position shown or upside down so that the solids are pushed up a pipe and discharged at a height sufficient to prevent the discharge of liquid.

For small production and laboratory filtering, a new small portable filtration unit, complete with motor and diaphragm pump, has been developed by T. Shriver & Co., Harrison, N. J. The unit, employing a plate and frame pressure filter with as many chambers as required, is portably mounted on casters.

Among the new developments in dust collection equipment is a venturi primary dust collector to be exhibited by Bowen Research Corp., Garwood, N. J. Dust laden air enters through a scroll where it is given a rotational velocity so that the dust is concentrated on the outer surface of the entering cone of a venturi. At the throat is an annular slot through which the dust passes while the cleaned air discharges through an expanding tube.

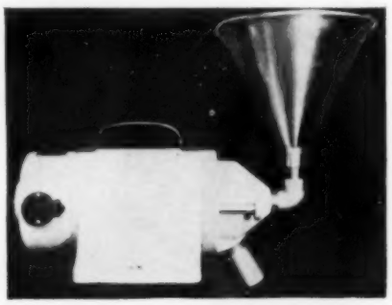
A new industrial electrostatic precipitator, for industrial air cleaning, developed jointly by Westinghouse Electric & Mfg. Co., and the Pangborn Corp., Hagerstown, Md. will be exhibited by the latter. The new unit employs a small vacuum tube power pack and may be designed for dust collecting efficiencies as high as 99 per cent by weight, to remove particles as small as 1/5 micron. An important application is in the recovery of valuable dusts.

Small plant dust collecting installations can be handled with the new Junior Multi-Wash dust collector to be shown by Claude B. Schneible Co., Chicago, Ill. As shown on the cutaway view on page 661, contaminated air is drawn into the lower section, spiraling upward between curved vanes wet with a cleaning liquid (usually water). Discharged water is generally freed of its sludge, using one of this company's dewatering tanks.

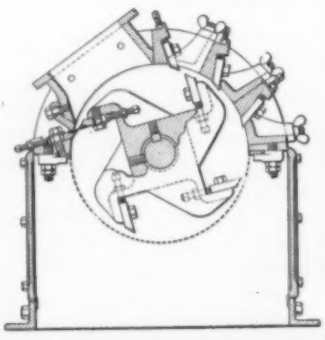
CRUSHING, GRINDING AND HOMOGENIZING EQUIPMENT

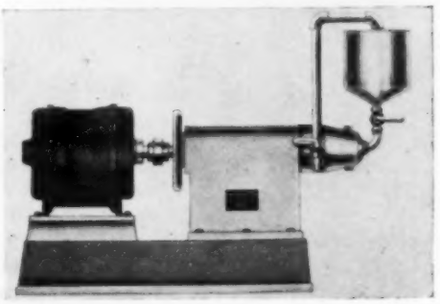
OF THE SEVERAL developments in grinding equipment to be shown by the Hardinge Co., York, Pa., one will be a newly designed reverse current air classifier for use in conjunction with its conical ball mill. The new design is said to increase mill capacity and maintain product fineness with unusual accuracy. In combination with a mill the unit can be arranged for drying within the mill.

A new forced draft system of closed-circuiting of grinding mills will be demonstrated by Federal

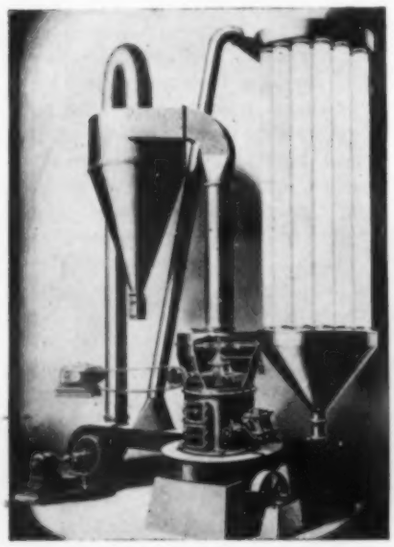


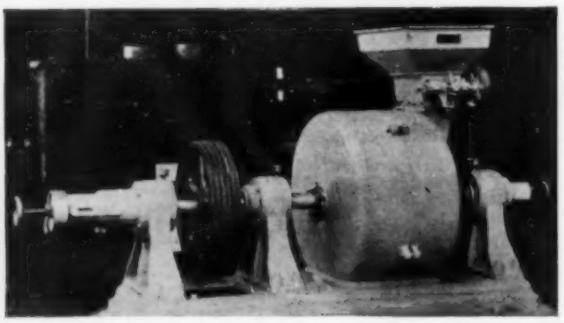
Right Above: Premier disperser
Right: Charlotte colloid mill
Left: Raymond roller mill
Below: Robinson knife cutter

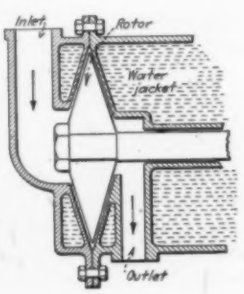




Left Below: Sprout-Waldron burr mill
Right Below: Manton-Gaulin colloid mill







Pneumatic Systems, Inc., Chicago, Ill. Air is recirculated from the centrifugal collector through a fan and the grinding mill wherein it picks up the fines, carrying them to a pneumatic classifier. Over-size returns to the air stream entering the mill while fines discharge to the collector. Part of the air supplied by the fan goes to the classifier where it serves to blow fines over to the collector. The atmospheric pressure point of the system is maintained close to the fan inlet, and by releasing a limited amount of air to the atmosphere, the zero point may be located immediately within the collector chamber. Such operation is said to promote the dust arresting efficiency of the collector, eliminating the usual tubular collector which requires constant mixing of the extreme fines with the coarser product in order to arrive at a uniform finished material.

What is said to be a totally new principle in pulverizing equipment will be exhibited by the Hurricane Pulverizer Co., Chicago, Ill. A rotor turning at high speed within a cylinder throws the particles to be ground outward from the center where they bombard each other into a powder. This air grinding action is continued through a series of air vortices until the particles reach a predetermined size and pass into a collector. Positive control of particle size is said to be attained, without the use of screens and with easy adjustment an important feature.

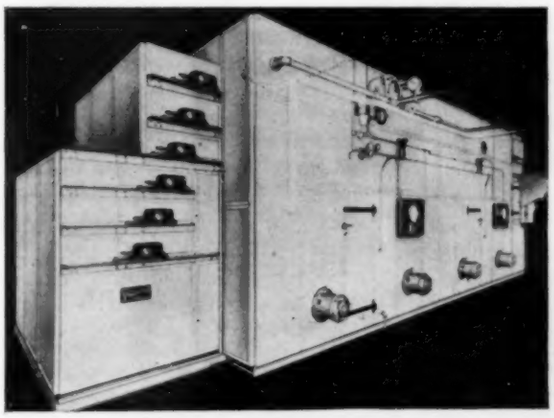
Pulverizing Machinery Co., Roselle Park, N. J., plans to exhibit a newly redesigned line of Mikro-Pulverizers stated to be more accessible for cleaning than earlier models. This is accomplished through the use of hinged covers secured by swing eye bolts.

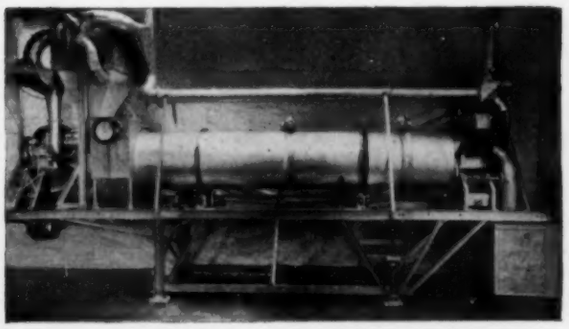
The bowl mill previously announced by the Raymond Pulverizer Division of Combustion Engineering Co., Chicago, Ill., has been improved in various particulars for coal grinding and direct firing of such equipment as rotary lime kilns. The company's improved mechanical air separator will also be exhibited. This type of separator is being used with both the bowl mill and the original type of roller mill.

Robinson Mfg. Co., Muncy, Pa., will show two new machines including a heavy duty knife cutter and a 13-in. motorized junior grinder. The first machine, shown in cross section in the accompanying sketch, employs a member carrying rotating knives which revolve with close clearance toward stationary knives carried by the casing. After being cut to proper size, materials are discharged through a screen in the bottom of the mill. The second machine employs a rotating grinding plate running in close proximity to a stationary plate. The rotating plate is mounted on an extension of the motor shaft within a grinding chamber bolted to the front end bell of the motor. The mill may be water-cooled if desired, or can be converted to water cooling at any time in the future.

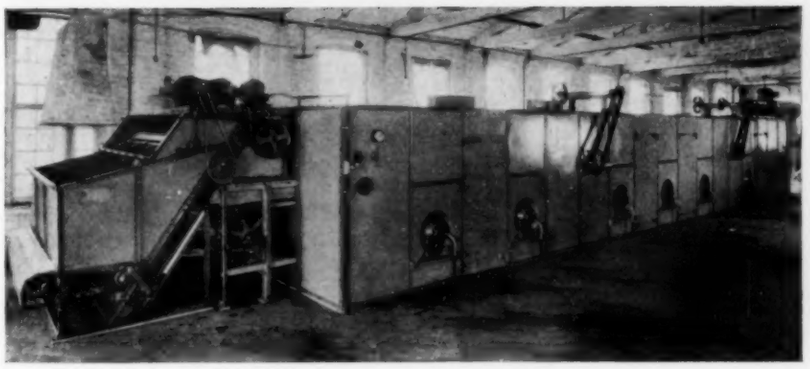
Several new grinding devices will be shown by Sprout, Waldron & Co., Muncy, Pa. A mill for flocking rags, fibers, and similar materials consists of a rotor carrying knives rotating within a cylindrical screen surface, also carrying stationary knives. As soon as material is cut to the desired size, it is withdrawn, usually by air suction. This company's ball bearing attrition mills are now being provided with inclosed fan-cooled motors which are dust- and explosion-proof. Still another new machine is a vertical ball-bearing burr mill provided with a new adjusting device said to permit more efficient operation. A revolving stone operates against a stationary stone, with material fed between the stones by means of a worm.

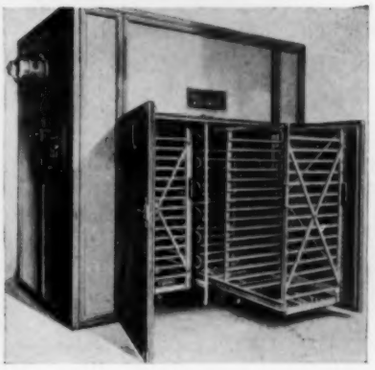
Several new colloid mills will be

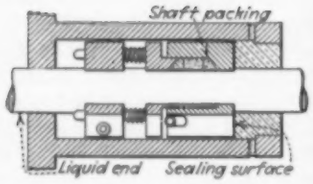




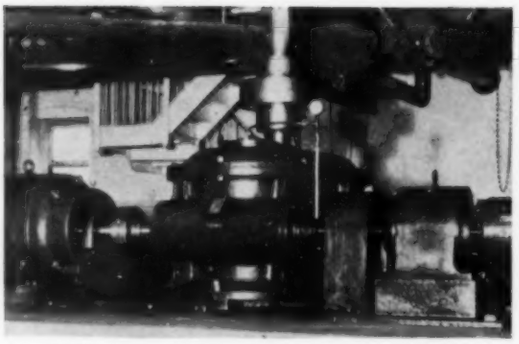
Left: Proctor & Schwartz reversing pan dryer
Right Below: Proctor truck dryer
Left Below: Philadelphia apron conveyor dryer
Below: Hersey Pilot dryer arranged for parallel flow



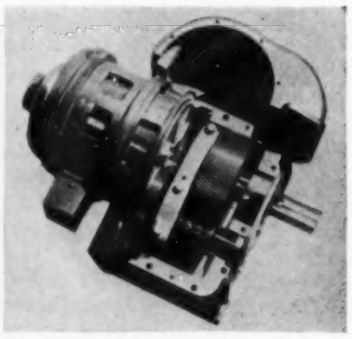




Cross section of Durametallic Dura Seal

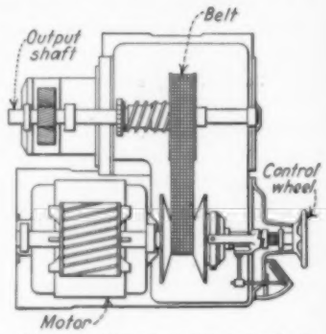


Foote Bros. double reduction agitator drive

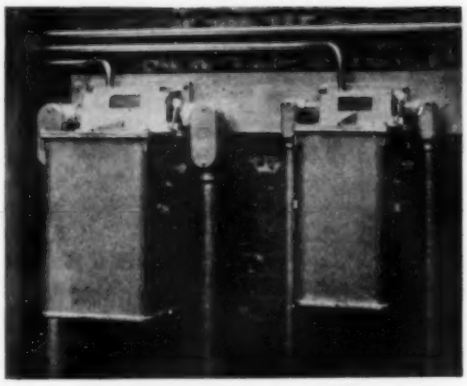


Westinghouse gear motor

shown. Chemicolloid Laboratories, New York, will exhibit a new Charlotte mill for small production and laboratory work. Its lack of a stuffing box is said to eliminate a great deal of friction and permit much smoother operation. Manton-Gaulin Mfg. Co., Everett, Mass., has developed a two-stage colloid mill built in several sizes, in which material passes first over one side, and then over the other side of the rotor, receiving a finishing treatment. Another machine for small production and laboratory work is the Disperser to be shown by the Premier Mill Corp., Geneva, N. Y., designed for general emulsion and mixing work. It features a high-speed rotor revolving at 14,000 to 17,000 r. p. m., with a close clearance of 0.002 to 0.004 in.



Reeves Motodrive transmission



Right: De-ion motor starters

DRYING EQUIPMENT

AMONG the drying equipment to be exhibited is the new Pilot dryer of the Hersey Mfg. Co., South Boston, Mass. This is a portable drying unit in which all of the variables met in regular plant scale drying are under accurate and measurable control. It is used in determining the size and style of drying equipment required for any given product. This machine is a rotary dryer equipped with feed and discharge mechanism and all the necessary instruments. It is built in two arrangements of air flow, one a counterflow dryer and the other a parallel flow dryer such as that shown in the accompanying illustration.

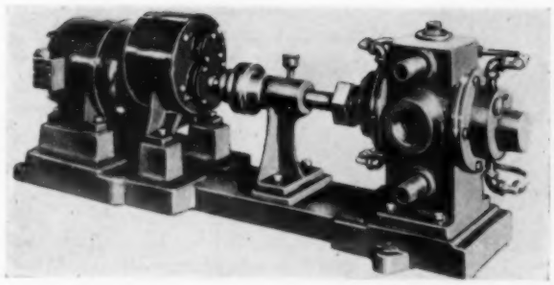
Philadelphia Drying Machinery Co., Philadelphia, Pa., will portray several types of dryer including a new apron conveyor dryer for chemicals. This machine is available in various designs including one using a continuous one-piece apron, another with sectional aprons. Various motor arrangements can be employed such as individual motors direct-connected to each blower, or group drive of all blowers.

Several improved dryers will be displayed by Proctor & Schwartz, Philadelphia, Pa. Among these is a new 12-tray dryer with rock wool and cork insulation, extended bearing motors and a design said to insure close control. A new laboratory dryer is of the electrically heated air-circulating type, with or without automatic control. The Aero-Form dryer originally announced at the last exposition, a dryer which preforms material into small sticks and delivers them in a pre-dried condition to a conveyor passing through a tunnel dryer, has been refined in many details. The reversing pan type of dryer for chemical products appears in modern dress with rockwool insulation and extended shaft motor bearings. A new truck dryer will also be displayed. This machine holds two trucks, which can be loaded with trays or pallets. The design is intended for close control of drying conditions, accomplished with a temperature recorder-controller.

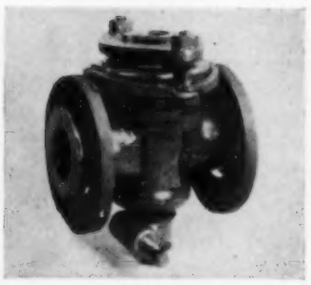
ELECTRICAL AND POWER TRANSMISSION EQUIPMENT

SEVERAL new pieces of apparatus will be shown by the Westinghouse Electric and Mfg., Co., East Pittsburgh, Pa. For electrolytic processes and other direct-current requirements, there will be a new form of power conversion apparatus—the Ignitron mercury arc rectifier. This device uses a new principle of starting the arc by external means at the beginning of each conducting period and confines each anode in a separate chamber.

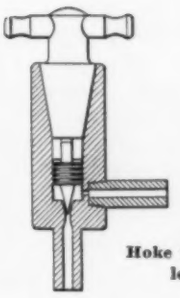
The maker claims that its higher efficiency over the conventional sealed tank rectifier makes it economical for lower voltage applications. In the same exhibit there will be a plate type Rectox rectifier which is made up from large rectangular plates spaced for ventilation instead of the familiar stacks of copper oxide disks under pressure. Application of this rectifier will also be largely in the low voltage conversion field. Illustrated on this page is one of the



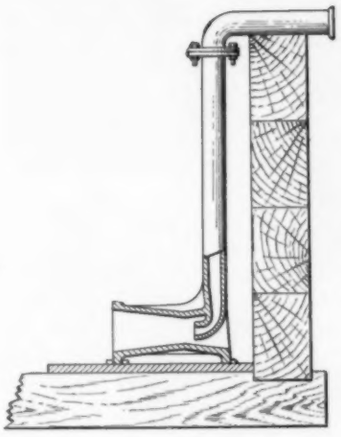
Beach-Russ rotary liquid pump



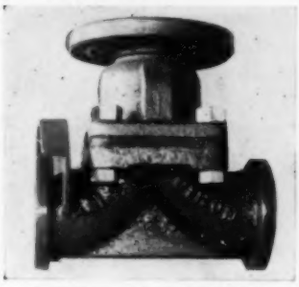
New Duriron lubricated plug cock



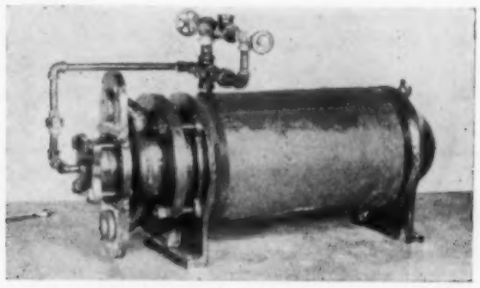
Hoke vacuum leak



Left: Antaciron tank heater



Antaciron Saunders valve



Small Duriron heat exchanger of 18 g.p.m. capacity

company's new line of fully-inclosed oil-immersed combination motor starters recently developed to meet operating requirements in the chemical industries. The features of these starters include short circuit protection by fuseless De-ion circuit breakers, a De-ion magnetic contractor for normal control of the motor, and inverse time overload protection by thermal induction relays. The new heat exchanger principle of cooling will be one of the features of a new totally inclosed, dual-ventilated, corrosion-resisting a. c. motor for constant speed work such as is required by blower and compressor drives. For general purpose mechanical drives of processing equipment, the Westinghouse Co. will exhibit one of its new line of Type C turbines. Another new piece of drive equipment will be the double reduction gear motor illustrated.

Reeves Pulley Co., Columbus, Ind., will display a new self-contained, variable speed drive, the Motodrive, first introduced last year. This drive, which makes possible infinite speed variation within predetermined limits, combines features of two of the same concern's earlier developments, the standard Reeves drive and the Vari-Speed motor pulley.

A heavy duty vertical agitator drive combining worm gear and helical gear reductions will be shown by Foote Bros. Gear & Machine Corp., Chicago.

By making use of a worm and worm gear on the first reduction and helical gears on the slow-speed reduction, this double-reduction unit is able to obtain a ratio which with any other type of gear could be obtained only by triple reduction.

The Durametallic Corp., Newark, N. J., will feature its Dura Seal for centrifugal and rotary pumps working with gritty or corrosive liquids. The actual seal is made by two metal plates which form a perfect ground joint. From the accompanying drawing, the device can be seen to consist of a stationary seal plate on the right faced by a seal plate on the left which rotates with the shaft, but which nevertheless is not so rigidly fixed to the shaft that it cannot respond to the pressure of the coil spring transmitted through the gland and packing to keep it tight up against the fixed plate and thus maintain the seal. Since the gland and packing both turn with the shaft, there is no wear on either, and it is claimed that friction is reduced to one-sixth that obtained with conventional type packing.

FLUIDS AND MATERIALS HANDLING EQUIPMENT

PRODUCTION of high vacuum, within 0.1 mm. of absolute on wet work and 0.5 micron on dry work, is the function of a new two-stage high-vacuum pump to be exhibited by Beach-Russ Co., New York. The two stages of the pump are cast integrally eliminating the possibility of leakage in the interstage piping. The pump is of this company's oil-sealed rotary type. A second development of this company is a steam-jacketed liquid pump for handling viscous materials. Employing the rotary pump principle, this equipment is said to avoid aeration and minimize turbulence. Various construction materials can be used, in capacities up to 440 g.p.m.

Lead pipe extruded with a precision said to be heretofore unattainable, has been developed by the Andrews Lead Co., Long Island City, N. Y., and will be exhibited. By the new process, lead is forced under high hydraulic pressure into a homogeneous, highly concentrated mass, said to be of better grain structure than is possible by the customary extrusion process. Then it is permitted to pass out of a relatively small opening at the top of the die where the actual pipe is formed. Owing to the method of constructing

the core and die, it is stated that absolute accuracy in wall thickness is attained with no possibility of an off-center opening. Owing to the developmental work involved in this new process, the company is not yet prepared to supply all sizes of lead pipe.

A noiseless steam ejector for agitating or heating the contents of process vessels will be shown by Antaciron, Inc., Raritan, N. J. This device is installed in the tank so as to set up circulation, as in the drawing, and is claimed to operate without noise or vibration. It is constructed of this company's corrosion-resisting, high-silicon cast iron. This company will also show a Hills-McCanna Saunders diaphragm pinch valve constructed of Antaciron. The principle of the valve is not new but its production in high silicon iron is said to be a recent development.

New developments to be exhibited by the Duriron Co., Dayton, Ohio, include a new heat exchanger which is a modification of the larger one previously announced by the company. It consists of three tubes: a steam tube, a baffle tube and an outer tube fitted inside a welded steam jacket. The liquid to be heated first flows in a split spiral to the end of the unit, absorbing heat from the internal heating tube. It then reverses its flow, absorbing heat from the steam jacket. All parts in contact with the fluid to be heated are made of Duriron. The unit is rated at 18 g.p.m. and 160,000 B.t.u. heat transfer per hour at 75 lb. steam pressure.

A new lubricated plug cock made by this company has a Duriron body and plug with a lubricant chamber in the base of the plug. It is known as Type 600.

Forcing in the lubricant lifts the plug, thus freeing it from sticking. Simultaneously, the sides and walls of the plug are lubricated. This valve is available in a number of sizes from 1 to 6 in.

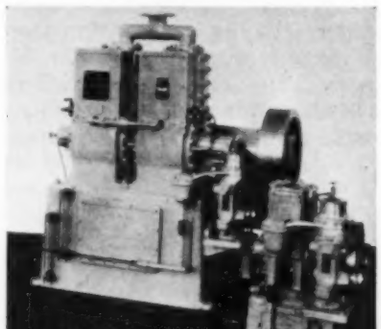
A small vacuum valve for semi-works and laboratory use, designed to serve as a high vacuum leak, will be shown by Hoke Inc., New York. As shown in the sketch the valve spindle is indirectly operated by a key. A seal is preserved without packing by grinding the tapered plug to its seat. The body is of brass and the needle of stainless steel.

Kinney Mfg. Co., Boston, Mass., will show new and improved pumps and a steam jacketed pump strainer. This company's dry vacuum pump has been equipped with a new type of oil-sealed valve, which is replaceable. A second pump is a steam jacketed rotary unit for pumping viscous materials containing abrasives, such as roofing asphalt mixed with slate dust. It employs overhung rotors, replaceable and reversible head liners, and bearings and timing gears in a separate oil-filled case. The company's new strainer has a steam jacketed body with an easily removable strainer basket, built in sizes from 2 to 16 in. for protecting pumps handling materials which must be kept hot in order to be strained.

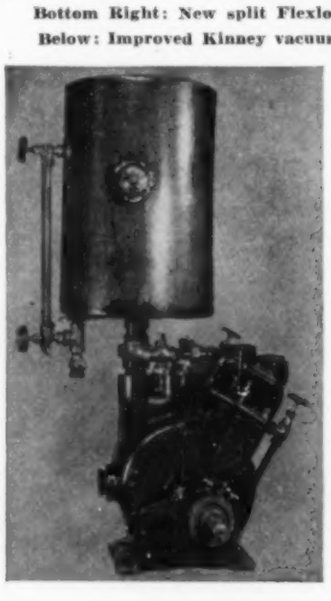
Among the exhibits of M. A. Knight, Akron, Ohio, will be a new rubber joint for ceramic pipe, which has been given the name of Pressure-Flex. This is a hollow ring which slips readily over the pipe and is inflated by the injection of a non-freezing solution to make a tight, flexible joint. It is said to be easier to install than other types of joint and to make a pressure line out of regular stoneware pipe.

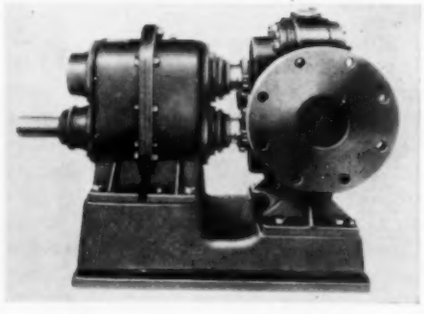
A new steam trap for pressure up to 500 lb., which features an automatic thermostatic air bypass built into the bucket, will be exhibited by the Sarco Co., New York. The trap is built of cast iron, semi-steel or cast steel, as required. It is claimed that the bypass is not affected by changing or fluctuating steam pressure, since it is of the balanced pressure type.

F. J. Stokes Machine Co., Philadelphia, Pa., will show an improved high vacum pump with a built-in continuous oil clarifier to permit the continuous production of vacuum within a few millimeters of absolute. The clarifier removes any water condensed in the sealing oil which would otherwise flash at high vacuum and thus prevent maximum efficiency. Solid impurities are also removed.

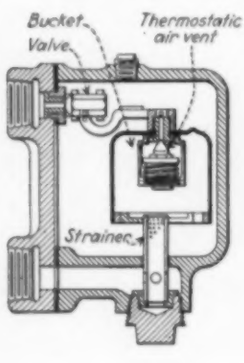


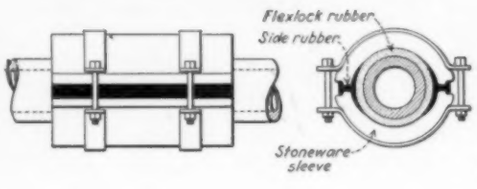
Right: Stokes vacuum pump with clarifier
Right Center: Kinney steam jacketed loading pump
Bottom Right: New split Flexlock joint
Below: Improved Kinney vacuum pump

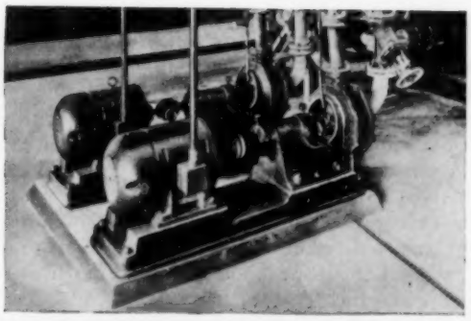


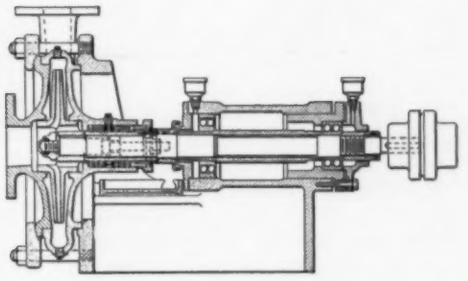


Sarco bucket steam trap

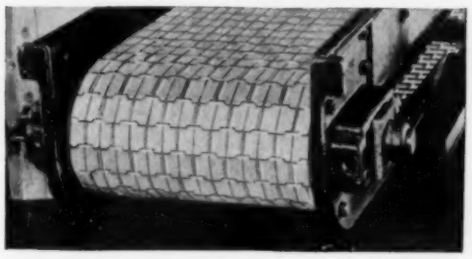








Worthite CQ closed impeller pump



Above: Acme Steelbelt conveyor
Top Left: Sabin barrel truck
Top: Worthington-Antaciron pumps

Right: Jeffrey vibrating conveyor

An accompanying drawing shows a modified type of Flexlock rubber sleeve joint for stoneware pipe to be shown by the United States Stoneware Co., Akron, Ohio. The new joint is split and so can be used for the insertion of new fittings or a new length of pipe in an old line. This type is also suggested for use in lines which need to be taken down at intervals.

Worthington Pump & Machinery Corp., Harrison, N. J., has developed a new line of chemical pumps since the last Chemical Exposition. These are available both in a new high-chrome, high-nickel alloy, Worthite, developed by the Worthington company, and in Antaciron. The latter type features a one-piece cast-together impeller and shaft carried on full double-row ball bearings. A similar line of pumps employing the same frame, bearings and bed plate is made in Worthite. This pump differs in that, since Worthite is machinable, the impeller is cast separate and keyed to the alloyed steel shaft. Replaceable Worthite shaft sleeves are used.

New materials handling equipment will be exhibited by several manufacturers. Acme Steel Co., Chicago, Ill., has developed a metal conveyor belt, known as Steelbelt, which provides a flat "table-top" for conveying. This is used on standard conveyor pulleys and rollers.

A vibrating conveyor will be part of the exhibit of the Jeffrey Mfg. Co., Columbus, Ohio. This employs the company's No. 2-A vibrator which operates on alternating current and can be instantly varied in capacity. Such conveyors are built in glass, stainless steel, aluminum, steel and other materials.

A pneumatic-tired barrel truck for steel drums will be shown by the Sabin Machine Co., Cleveland, Ohio. The drum is tipped onto the truck, clamped in place and then the truck is tipped by hand and foot pressure. A third wheel which is part of the foot pedal can be used to rest the drum in the traveling position.

Among the materials handling developments to be shown by Stephens-Adamson Mfg. Co., Aurora, Ill., will be a loop type Redler elevator of a design permitting a low loading point with little if any pit. An improved box-car loader will be shown together with a new pipe-frame belt conveyor carrier made for mounting on simple pipe frames, rather than structural steel stringers.

MIXERS, AGITATORS, SIFTERS AND SEPARATORS

SEVERAL new mixers will be exhibited including an improved Abbe-Lenart mixer for heavy pastes or other viscous materials, shown by the Abbe Engineering Co., New York. The original type has been equipped with a special duplex scraper and agitator mechanism whereby two sets of blades rotate in opposite directions, one set scraping the heavy material off the cylinder surface and the other set breaking up the mass thrown out by the mixing disk. The scraper and agitator mechanism can easily be lowered into the tank or raised from it by hand.

A number of improved mixers for heavy materials will be exhibited by Baker Perkins Co., Saginaw, Mich. The new Unidor mixer is nontilting and equipped with a quick-opening discharge door in the bottom. Two cast iron sigma blades with hardened steel wearing shoes are provided. Anti-friction bearings and silent chain drives are employed. The company's vacuum mixers have been further refined for high vacuum operation and specifically for the flushing of pigments in the manufacture of inks and enamels. In other heavy duty mixers refinements have been

made to permit more thorough mixing and dispersing of viscous plastics.

Denver Equipment Co., Denver, Colo., will show a new side air-lift agitator for agitation, aeration or conditioning of finely divided materials in suspension. The rotating rake shown in the accompanying drawing can be set at any angle from horizontal to 45 deg. Air lifts at the sides remove the material thrown outward by the agitator arms and return it to the top of the agitator for redistribution.

Pre-mixing and agitating is the function of the new Homo-Rod mixer to be shown by Eppenbach, Inc., Long Island City, N. Y. The mixer is dropped into a tank as shown in the drawing, sucking material upward through a turbine and discharging it toward the top of the tank so as to prevent the incorporation of air. The device is adjustable to various sizes of tanks and is constructed of stainless materials.

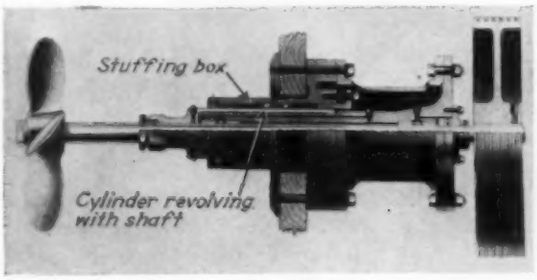
New principles in stuffing box construction and bearing design are found in a new side-entering Bearing Guard mixer to be shown by the Mixing Equipment Co., Rochester, N. Y. An accompanying illustration shows that the stuffing box itself has no contact with the shaft proper. A "folded back" member (a hollow cylinder open at one end) is securely attached to and revolves with the shaft, taking all the wear at this point. This sleeve is readily removable and replaceable. The bearings do not come in contact with the liquid in the tank. The stuffing box can be reached and lubricated from the outside. At present this agitator is available in sizes up to 20 hp., for V-belt drive.

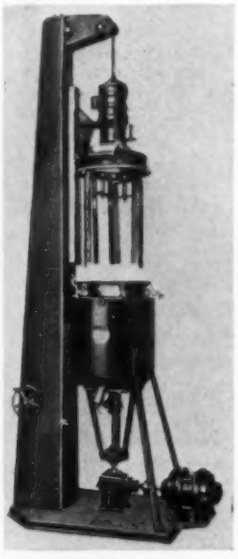
A new line of high speed mixers in chemical stoneware tanks is to be introduced at the Show under the name of Cyclonaire by the United States Stoneware Co., Akron, Ohio, in sizes from 50 to 200 gal. A small airplane type propeller driven by a direct connected motor forces a stream around the round bottom of the tank and upward, producing a strong mixing action, according to the manufacturer. Both the shaft and the outlet of the tank are mounted in Flexlock rubber sleeves which is claimed completely to eliminate vibration.

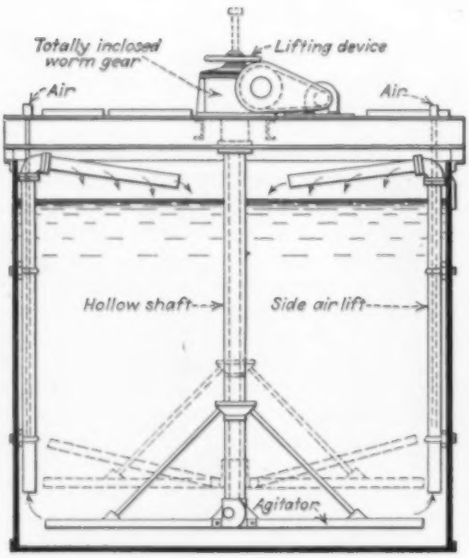
Among the equipment for screening and other separating operations will be several devices of considerable novelty. Allis-Chalmers Mfg. Co., Milwaukee, Wis., will show its electrically vibrated screens which were developed in cooperation with the Utah Copper Co. Another line of electrically vibrated screens will be those shown together with other vibrating equipment by the Jeffrey Mfg. Co., Columbus, Ohio.

Several magnetic separators will be shown by the Dings Magnetic Separator Co., Milwaukee, Wis., including a new air-cooled magnetic pulley, the improved type CF magnetic separator for purifying and cleaning dry powdered materials such as fine feldspar, frit, clay, enamels and other materials, and a new wet-type separator for suspensions of solids containing iron particles. This is known as the De-Ironer and employs as the collecting surface a stack of metal grids containing a great length of collecting edge.

S. G. Frantz' Co., New York, manufacturing the Ferro Filter magnetic separator, will show a new type which is inclosed for installation in a pipe line as pictured in the sketch. Another new type is an underfed open model. Still another innovation is the extensive use of stainless steel with the complete elimination of iron castings from contact with the material being separated. Separators of this type are employed for the removal of iron particles from







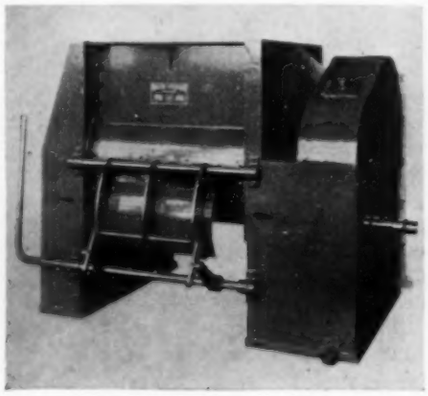
Above: Detail of Bearing Guard agitator

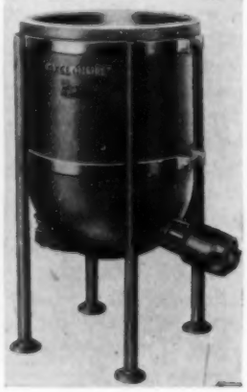
Right: Abbe-Lenart mixer with scraper lifted from tank

Left: Denver side air-lift agitator

Right Below: New Cyclonaire mixer

Below: Baker-Perkins Unidor mixer





such materials as casting slips and enamels. They employ as the separating device a stack of magnetized screens inside a cylindrical coil. Even in the smaller models a tremendous length of collecting edge is thus secured which is said to result in extremely high efficiency.

A newly designed screen for sifting, rebolting and similar operations on flaked, powdered, granular and pulverized materials, to which the name Bar-Nun sifter has been given, will be shown by the B. F. Gump Co., Chicago. This sifter has a complete rotary motion produced by stabilizing bearings. It is made in nine sizes having from 5 to 50 sq. ft. of cloth surface.

Several new developments in testing sieves are those of the Newark Wire Cloth Co., Newark, N. J. One is the End-Shak testing sieve shaker, a device which gives a combined reciprocating and turning motion to the several sieves it holds. Another development is a set of small hand sieves which stack into a pile small enough to be carried in a hand bag, while another new set is designed to nest one within another so that the entire group occupies scarcely more space than a single sieve.

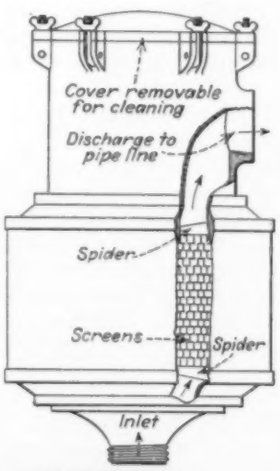
Productive Equipment Corp., Chicago, will show a redesigned positive eccentric type of vibrating screen known as the Selectro which is provided with a direct-connected motor. The eccentric can be adjusted to eight distinct settings and the screen deck tilted to any desired angle with the angle of tilt plainly marked.

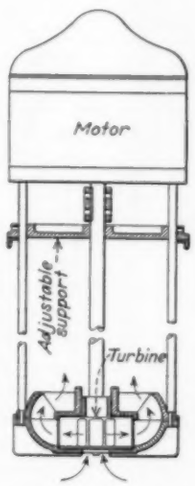
A new sifter said to be of exceptionally high capacity, developed by the Richmond Mfg. Co., Lockport, N. Y., will be exhibited by the Separations Engineering Co., New York. This new screen, the Gyro-Whip, is powered by a ¼- to ¾-hp. motor and provided with from one to ten sieves. Depending on the mesh and material, capacity is said to range between 500 and 25,000 lb. per hour in a machine measuring only about 3 ft. square. The sifter box is supported by flexing reeds and whips in a motion combining a quick circular throw with a slight up and down movement. Action is said to be sharp yet silent.

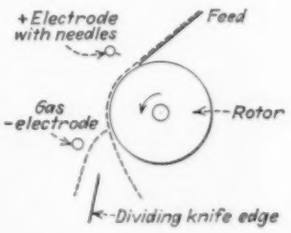
Another display of the Separations Engineering Co. will be a new electrostatic separator for mineral products developed by Sutton, Steele & Steele, of Dallas. This machine, shown diagrammatically in the sketch, is said to avoid the difficulties experienced with earlier electrostatic separators. The feed, having been warmed to about 125 deg. F., discharges from a hopper onto a grounded metal rotor, in so doing passing a positive electrode carrying a multitude of needle points charged to a high voltage. The particles are all positively charged and so cling to the rotor where some lose their charge more quickly than others. Those retaining their charge longer are carried farther by the rotor than the others, which are assisted in losing their charge by a negatively charged glass tube containing a suitable gas.

This same concern will show another Sutton, Steele & Steele development, an air table to which an additional deck has been added with material improvement in results owing to the addition of some 20 per cent of working space on the same chassis and fan.

In the booth of Sprout, Waldron & Co., Muncy, Pa., will be a new sifter, known as the Perfect Circle, which uses from one to four screens of 2 to 250 mesh and is given a perfect circular motion by an underneath drive. Antifriction bearings are employed and complete elimination of dead spots is said to be attained. Ten sizes are available.







Above: Diagram of new electrostatic separator

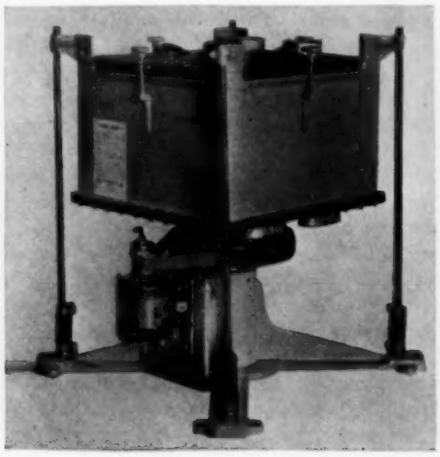
Extreme Left: Frantz pipe line magnetic separator

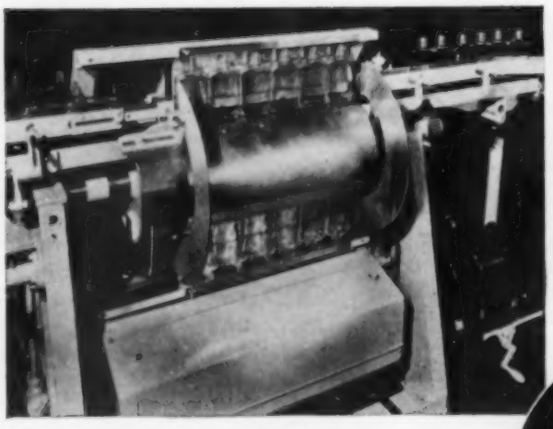
Left: Eppenbach Homo-Rod mixer

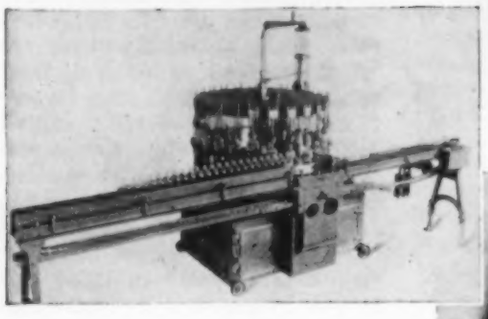
Bottom Left: Nest of Newark sieves

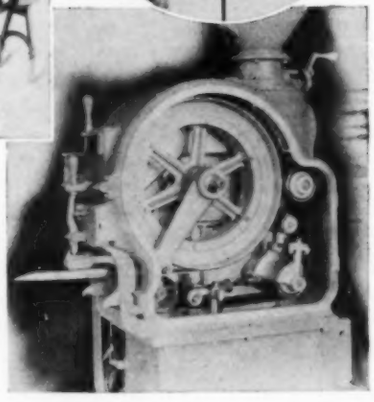
Bottom Center: Richmond Gyro-Whip sifter

Bottom Right: Sprout-Waldron Perfect Circle screen









Above: Kiefer rotary bottle filler

Top left: Pneumatic Scale bottle cleaner

Top Center: Aluminum barrel for chemicals

Top Right: Securing drums by Acme Unit Load System

Circle: New Acme Steel Strapper

Right: St. Regis bag packer showing interior

PACKAGING AND BOTTLING EQUIPMENT

ACME STEEL CO., Chicago, Ill., has adapted its steel strapping to the problem of bracing unit loads in freight car ladings. The straps are placed around groups of individual packages for shipment, thus creating a single large unit which is stated to resist transportation shocks without costly timber bracing. The company will also show the new model steel strapper which tension seals and automatically cuts the steel straps with a single stroke of each of the two levers.

Alsop Engineering Corp., Milldale, Conn., plans to exhibit a new noiseless Labelit machine which puts gum on paper labels at the rate of from three to ten a second. The same company will exhibit the Screwcapper, a machine for putting screw caps on bottles and other containers. The device consists of a vertical motor connected through a flexible shaft and adjustable tension clutch to a rubber-lined chuck which fits all styles of caps.

Aluminum Co. of America, Pittsburgh, Pa., will show an aluminum barrel for the shipment of non-regulatory liquid commodities. This container was originally developed as a beer barrel, but has now been modified in certain respects, particularly by the addition of screwed fittings.

A new bag-holder and some new sewing machine attachments for the tape sealing of open-mouth multiwall paper bags and textile bags will be shown by the Bemis Bro. Bag Co., St. Louis, Mo. The Jeffrey Mfg. Co., Columbus, Ohio, will exhibit its new floor-level electric vibrating barrel packer of low head, and capacity up to 800 lb. gross.

Karl Kiefer Machine Co., Cincinnati, Ohio, will feature two new bottle-filling machines. One of these, illustrated herewith, is a fast-filling machine of the automatic rotary vacuum type, while the other, known as the Vari-Visco, will fill up to 150 containers a minute of such products as jellies, foods, cold cream and other semi-liquids. X-Crepe is a new waterproof, vaporproof and flexible paper for making case linings and bags for shipping, to be shown by Paper Service Co., Lockland, Ohio. The material consists of two thicknesses of crepe paper held together with a layer of binder which is stated to be water and vapor resistant.

Pneumatic Scale Corp., Quincy, Mass., will show its new inverted-bottle type air cleaner, a machine used for the dry air cleaning of new glass containers. The bottles from the feedline are caught on a cylindrical drum which then rotates through 180 deg. to turn the bottles upside down before they are subjected to a 60-lb. blast of clean, dry air. It is claimed that more efficient and thorough cleaning can be effected while the bottles are in an upside down position. With six cleaning heads on the cylinder, the machine can operate at a rate of 100 average size bottles per minute.

A machine for the automatic filling of valve type multi-wall paper bags will be displayed by the St. Regis Paper Co., New York. This new type of packer operates on a principle involving the use of centrifugal force in connection with a rapidly moving belt which is claimed to be satisfactory for handling granular and crystalline materials as well as pulverized products, thus extending the utility of the valve type bag. In the accompanying illustration the side plate has been removed from the machine showing the grooved pulley and belt arrangement.

PROCESS CONTROL INSTRUMENTS

AS USUAL at Chemical Expositions, a great many new process control instruments will be on display. In the booth of the Bailey Meter Co., Cleveland, Ohio, will be this company's new Synchro-Meter and a new diaphragm-operated, multipointer gage. The first is an electrical transmission system for indicating, recording and integrating such factors as flow rate, pressure, temperature, liquid level and draft at distant points. Several receivers may be operated from one transmitter. Essentially the system makes use of a circuit in which contacts in both receiver and transmitter are broken periodically. The duration of contact at the transmitter, regulated by the quantity being measured, determines whether the receiver indication will be increased, decreased or remain stationary.

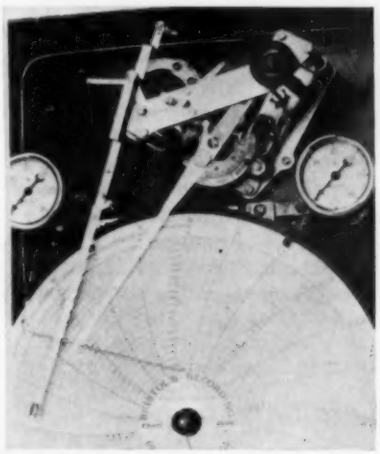
The new multi-pointer gage features a new diaphragm material which is resistant to oil, acid, caustic and heat and is said to possess exceptional flexibility. Motion of the diaphragm is opposed by a flat calibrated spring to operate a pointer on a scale. Exceptional sensitivity is claimed.

The Bristol Co., Waterbury, Conn., will show several new instruments including a line of air-operated controllers given the name of Ampliset. In these instruments the sensitivity may be changed to compensate for process lag. Another new instrument is an electric flowmeter using this company's Metameter principle of telemetering. The transmitter is equipped with a mercury manometer and mechanism for the production of electrical impulses of duration proportional to the square root of the pressure differential. The receiver contains recording mechanism and a new electric integrator. Other new instruments will include a line of round chart recording voltmeters and ammeters and the Pyromaster, a new construction used in potentiometer and resistance thermometer types. No mechanical connection is required between the galvanometer and the other units of the instrument, a series of relay-actuated switches operating a motor to move a slide wire contact.

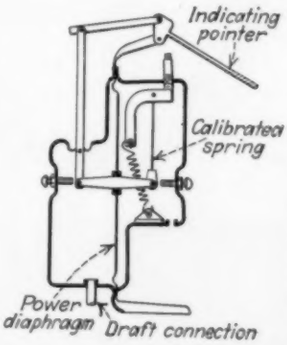
How this company's system of coordinated process control operates will also be demonstrated. This system employs a multiple-cam cycle controller to control in proper sequence as many of the steps of a process as may be desired.

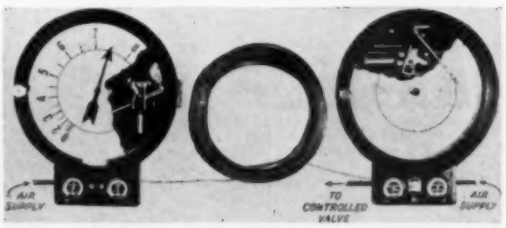
A variety of new developments will be presented in the booth of the Brown Instrument, Co., Philadelphia, Pa. One is a new pneumatic control transmission system, or telemeter, by means of which temperature, pressure, flow and liquid level measurements may be indicated, recorded and controlled remotely. Requiring no motor, this system is suggested for use where a fire or explosion hazard exists. The transmitter positions a flapper over a leak nozzle in a system which is provided with a follow-up mechanism to produce correspondence between the indication and the transmitted pressure. This pressure is then transmitted through tubing to a receiving pressure gage combined with whatever indicating, recording or controlling equipment may be designed.

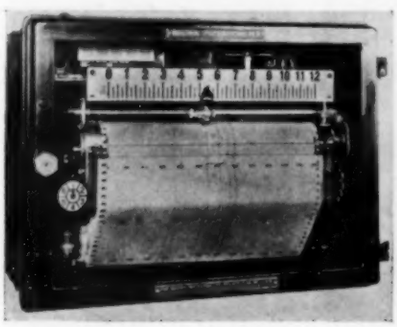
Another new instrument is a multiple recording and controlling potentiometer pyrometer which will not only record but also control from two to six temperatures as measured by as many thermocouples. The Protectoglo system of combustion safeguarding will also be shown, completely redesigned to employ stan-

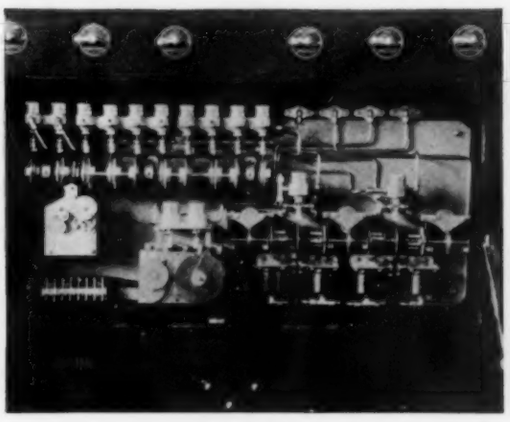


Right: Bristol Ampliset controller
Right Center: Brown pneumatic telemeter
Bottom Left: Brown multiple-recording pyrometer
Bottom Center: Bailey Synchro-Meter transmitter
Bottom Right: Bristol pneumatic cycle controller for coordinated control
Below: Bailey diaphragm gage









dard radio tubes. Utilizing the electrical conductivity of the flame, the instrument operates to shut down the equipment should the flame be extinguished. Other improvements include safety cut-off switches for use on this company's air-operated controllers and multiple recording potentiometers. The switch may be used to give an alarm or start or stop motors.

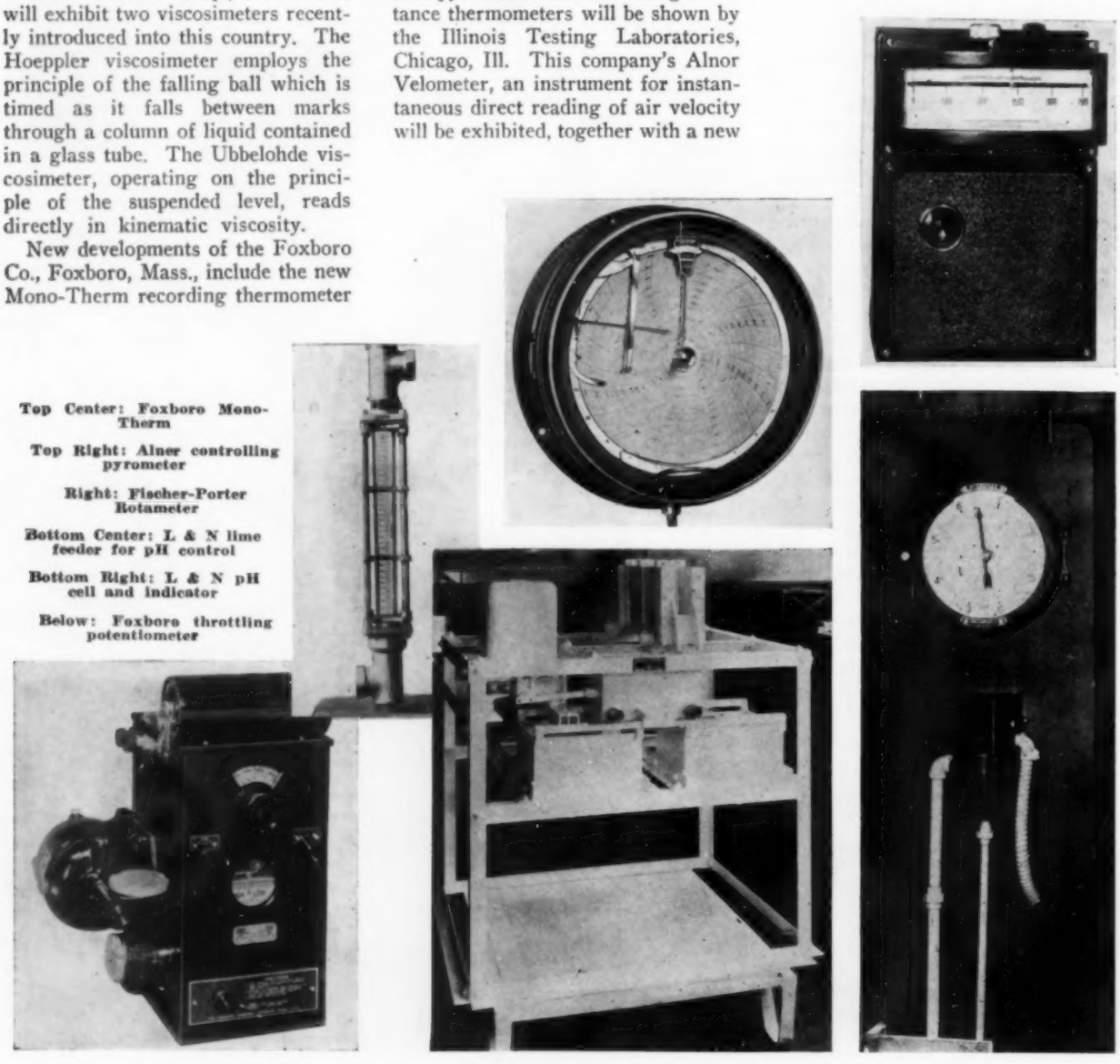
Fischer & Porter Co., Philadelphia, Pa., a new factor in the flowmeter field, will show three of their new Rotameter taper-tube flowmeters in the booth of the Corning Glass Works. The tubes employed in these meters are of a new precision bore type. These are the first meters of the type to employ Pyrex glass metering floats.

Fish-Schurman Corp., New York, will exhibit two viscosimeters recently introduced into this country. The Hoeppler viscosimeter employs the principle of the falling ball which is timed as it falls between marks through a column of liquid contained in a glass tube. The Ubbelohde viscosimeter, operating on the principle of the suspended level, reads directly in kinematic viscosity.

New developments of the Foxboro Co., Foxboro, Mass., include the new Mono-Therm recording thermometer which employs a permanently sealed thermal system, practically equal to one-piece construction from bulb to recorder. Greater over-range protection and other improvements are to be noted. In a new throttling type potentiometer controllers, a second slide wire in the control circuit is provided for smooth operation. When the galvanometer pointer unbalances the bridge on a change of temperature, a sensitive relay detects the current flow, causing a corresponding readjustment of the motor operated valve and simultaneously rebalancing the bridge circuit. A new pneumatic telemeter will be shown for remote controlling and recording and will be available for use where electrical transmission is not desired.

Several improvements in its surface pyrometers and indicating resistance thermometers will be shown by the Illinois Testing Laboratories, Chicago, Ill. This company's Alnor Velometer, an instrument for instantaneous direct reading of air velocity will be exhibited, together with a new Alnor pyrometer controller which operates on an electronic principle. The indicating pointer carries a small vane which, when it approaches two condenser plates carried on an adjustable target, changes the capacity of a tuned circuit, operating a relay and shutting off the electrical or fuel supply.

Important among the new developments to be exhibited by Leeds & Northrup Co., Philadelphia, Pa., will be improved recording equipment for flue gas analysis. The new CO_2 recorder operates on alternating current, employing a new saturated gas cell. Instead of drying the gas as formerly, the new method saturates it with water vapor, attaining rapid results. The circuit employed is of the thermal conductivity type.



Top Center: Foxboro Mono-Therm

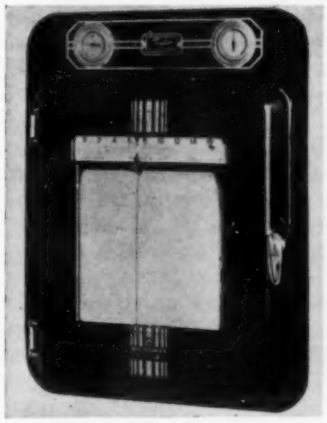
Top Right: Alnor controlling pyrometer

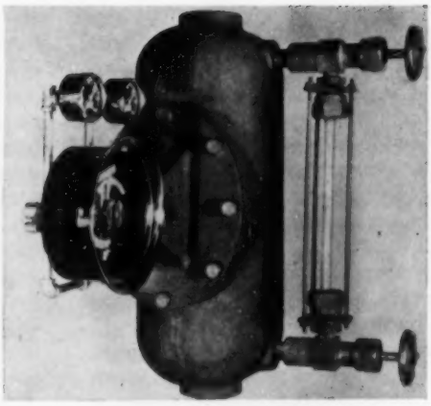
Right: Fischer-Porter Rotameter

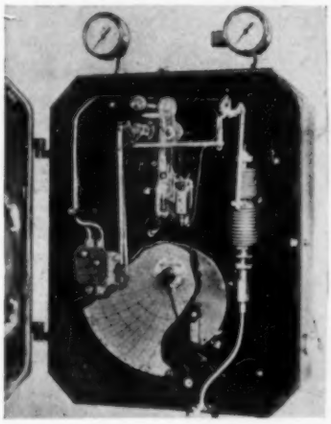
Bottom Center: L & N lime feeder for pH control

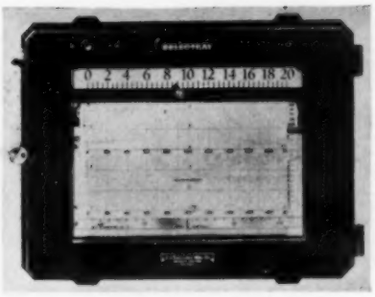
Bottom Right: L & N pH cell and indicator

Below: Foxboro throttling potentiometer









Above: Tag Selectray potentiometer

Top Left: Taylor Fulscope Micromax temperature controller

Top: Tag level controller

Left: Taylor absolute pressure recorder

New pH equipment also to be shown is of a type developed for continuous water treatment. It employs an antimony-calomel electrode in conjunction with a Micromax controller, a relay and a drive mechanism mounted on a valve or on a special feeder used for milk of lime. With this feeder the milk of lime is continuously recirculated and the portion required for control is diverted by a cutting box.

Among the several new developments of the Taylor Instrument Cos., Rochester, N. Y., is the new Fulscope Micromax controller which combines an automatic potentiometer with an adjustable air-operated control mechanism. The temperature measuring system is the Micromax recording and indicating potentiometer with which is combined the company's Fulscope pneumatic control system. Another new instrument is a recorder and/or controller for absolute pressure. Its mechanism includes a bellows communicating with the measured pressure system, connected to a second identical bellows, evacuated and sealed to act as an atmospheric pressure compensator.

The company's mercury-in-glass industrial thermometers are now provided with a new type of tube known as Binoc, having a triple-lens construction making the mercury column much easier to read. A diaphragm motor has been developed, employing all welded steel construction which is now used for diaphragm valves and for lever motor service in the operation of dampers, etc. The company's new Permax hydrometers employ an enameled light-weight metal scale fused in the alloy weighting material and designed to give a wide angle of vision.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., will feature several new instruments including a photoelectrically balanced recording potentiometer, known as the Selectray. When the instrument is unbalanced a beam of light from a mirror galvanometer passes the "controlling edge" of a screen shielding a phototube, thus operating relays which in turn control a reversing motor, driving the moving contact of the wheatstone bridge or potentiometer.

The new float-type level controller also to be exhibited is of the air-operated type, controlled by the rise and fall of a float within a chamber. Movement of the float turns a cam, in turn moving a system of levers and positioning a pilot air valve, thus controlling the opening of a diaphragm valve. Other improved instruments include redesigned models of the Tag-Heppenstall moisture meter and the company's self-operated temperature controller.

PROCESS AND REACTION EQUIPMENT

WATER STILLS to be exhibited by Barnstead Still & Sterilizer Co., Forest Hills, Mass., will feature a number of improvements. The large industrial stills in sizes of 50 gal. per hour and upwards now have the steam-heating coil mounted on the evaporator trap door. When the door is swung open, easy access to both the interior and the coil results. A demountable condenser is used, readily taken down for cleaning. A new hard water still makes use of a constant bleeder device which at all times prevents excessive concentration of impurities.

First showing of a new venturi washer, scrubber and concentrator is to be made by Bowen Research Corp., Garwood, N. J. This equipment is intended for scrubbing dusts out of gases, for concentrating liquids by means of hot air and for reacting solids, liquids and gases. As in the drawing (p. 674), this consists of a fan discharging into a scroll at the bottom of a venturi tube, above which is a liquid spray rotor. Centrifugal action in the tube causes discharge of the liquid at a slot in the throat, while the dried gas passes out the venturi discharge.

Types of process equipment manufactured by the Blaw-Knox Co., Pittsburgh, Pa., will be demonstrated by a unique mechanical robot which will present an illustrated talk regarding the equipment.

Complete absorption of HCl gas in water in one pass is the function of a new absorber, said to differ radically in principle from existing equipment, to be exhibited by the Fansteel Metallurgical Corp., North Chicago, Ill. Tantalum is the only metal in contact with either the gas or the acid. Other parts of the absorber are built of steel or corro-

sion-proof plastics. Flow of gas, absorption water and cooling water may be regulated automatically for producing constant strength acid. Owing to the high heat absorptive capacity of the apparatus, acid up to 35 per cent concentration can be produced using cooling water at temperatures as high as 80 deg. F.

A miniature vitamin D irradiator intended primarily for use on milk, but probably also applicable in pharmaceutical work, will be demonstrated by Hanovia Chemical & Mfg. Co., Newark, N. J.

For the first time, visitors at the Exposition will be able to view the new Model 25 injection molding machine just developed by the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. This is a self-contained machine for molding such thermoplastics as cellulose acetate, using the extrusion process. The machine clamps the mold halves under hydraulic pressure, feeds, measures and heats the molding material, extrudes the plastic material under high pressure into the mold cavities, opens the mold and ejects the finished article.

Another new absorber for HCl is an internally cooled stoneware tower to be shown by M. A. Knight, Akron, Ohio.

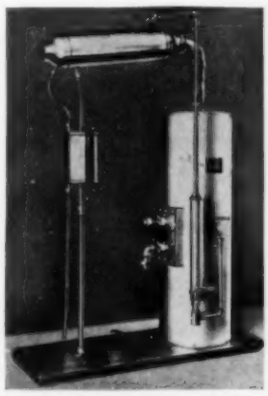
Process equipment of glass-lined construction to be shown by the Pfaudler Co., Rochester, N. Y., will include a new 1,000-gal. reaction kettle, with the designation of XL Series. The equipment of this series is available in modifications for both distillation and reaction, with various types of agitators and drives. The company expects also to show a new 10-gal. glass-lined steel autoclave for pressures up to 1,000 lb. per sq. in. Intended for large-scale experimental and pilot plant work, and for small production, the design features a new bearing and stuffing box.

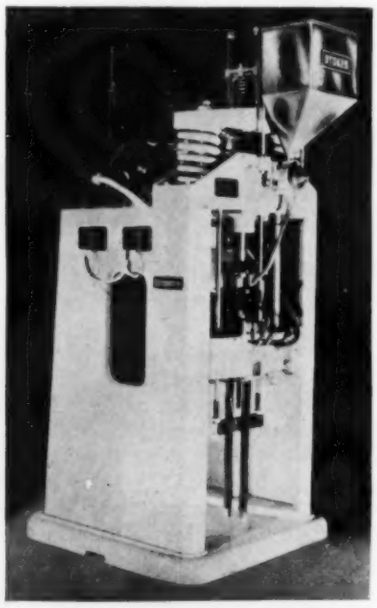
Recent developments in molding will be found in the exhibit of F. J. Stokes Machine Co., Philadelphia, Pa. The Stokes Standard preforming tabletting machine is one of these, a toggle-hydraulic type exerting up to 80 tons pressure and used for preforming molding materials and compressing chemicals, pharmaceutical and ceramic materials. A new automatic molding press for plastics of the phenolic and urea type is another. This press performs automatically all customary operations of the molding cycle, including filling the mold, closing, cleaning by air jets, curing, opening the mold, ejecting the finished article and cleaning the mold. It is intended primarily for use with single cavity molds of the positive type. Safeguards are provided against damage to both mold and mechanism.

SAFETY AND FIRE PROTECTION EQUIPMENT

SUCCESSFUL artificial respiration demands assurance against excessive pressure in the lungs produced by the equipment, according to Hoke, Inc., New York, who will show the new William Branower respirator which is doubly protected against excessive pressure by the use of two safety valves, one of the mercury type and the other of the diaphragm type, adjustable to blow off at any predetermined pressure.

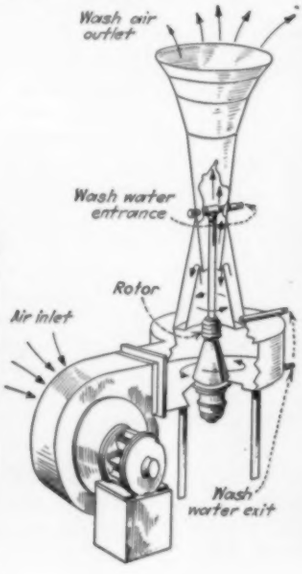
The complete new line of Lux carbon dioxide fire extinguishing equipment produced by Walter Kidde & Co., New York, will be shown for the first time at the Chemical Exposition. A number of de-





Extreme Right: Stokes automatic molding press
Right: Barnstead hard-water still
Bottom Center: MSA mercury vapor detector
Bottom Right: Lux portable extinguisher in action
Below: Bowen venturi washer, scrubber, concentrator

Pfaudler 1,000-gal. glass-lined kettle



sign improvements have recently been incorporated in this equipment, including a new type of discharge horn which is oval in cross section, made of non-shatterable material and is said to give a longer range, wider and denser blanket of gas and snow. Extinguisher cylinders are provided with two types of valve, one with a metal disk which is cut out completely in operation and the other with a seating type valve which can be permanently closed at will.

Mine Safety Appliances Co., Pittsburgh, Pa., will show a considerable number of new developments in safety equipment, most of them announced for the first time. A new pocket-sized Explosimeter weighing less than 3 lb., with batteries, can be operated by any workman and instantly indicates the gas concentration by volume on a dial. The instrument shows whether this concentration is in the explosive range. It is of the type employing a hot platinum wire in a balanced electric circuit. Another instrument for industrial safety, developed in conjunction with the General Electric Co., is a new mercury vapor detector in which selenium sulphide paper is darkened even by infinitesimal quantities of mercury vapor. The paper is placed in a chimney heated with an electric lamp to create the proper temperature and draft. The concentration can be determined from a chart.

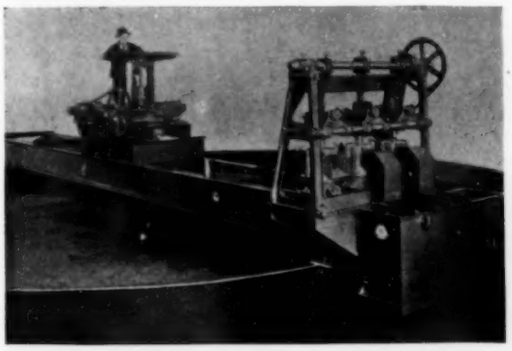
For use in unbreathable atmospheres, a new 1-hour oxygen breathing apparatus has been developed to furnish protection for at least that time under heavy exertion. This is a light-weight device, similar to the earlier 1/2-hour apparatus. For use in atmospheres which can be rendered breathable by adequate ventilation, the new MSA-Lamb Ventair is available for producing positive movement of large volumes of air into or out of areas requiring ventilation. This device is a venturi supplied with compressed air, each pound of which is effective in moving a much greater amount of atmospheric air through the tube.

Other new developments include a combustible gas alarm which continuously samples the gas and sounds an alarm when flammable materials are present. A new salt tablet dispenser has been developed for use in factories where salt tablets need to be taken occasionally by the workmen to avoid heat sickness. A new all-weather first aid kit, available in 10, 16, 24 and 36 unit models, has been designed to exclude dirt and water through the use of a heavy case with tight fitting cover and rubber gasket.

THICKENERS AND CLASSIFIERS

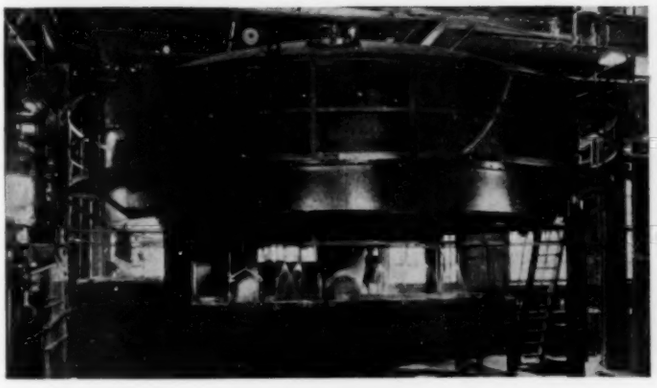
A THICKENER with a low head-beam superstructure will be featured by the Denver Equipment Co., Denver, Colo. This type of construction is particularly advantageous in installations where the available head-room is limited. Although the head-beam is low, the worm gear and drive have been placed high enough above the liquid level to prevent damage from foam or dirt. The rakes on this machine consist of four spiral segments radiating from supporting cross-beams attached to the bottom of the central shaft. The spiral rakes bring the settled material directly to the central discharge cone in one revolution, thus reducing power required and preventing overloads, it is claimed. This thickener is built in sizes up to 40 ft. diameter, or larger.

The Dorr Co., New York, will exhibit three new developments in its line of classifying and thickening equipment. The Adka Saveall is a machine for the recovery of fiber and filler from paper mill effluent, or, as in some paperboard mills, for clarification of white water for reuse. The machine first aerates the white water and then passes it through a vertical draft tube into a large tank in which a partial vacuum is maintained. The reduction in pressure releases air bubbles in the aerated water, and the fiber and filler contained in the chemically conditioned white water attach themselves to the air bubbles. The fiber and filler are thus caused to float to

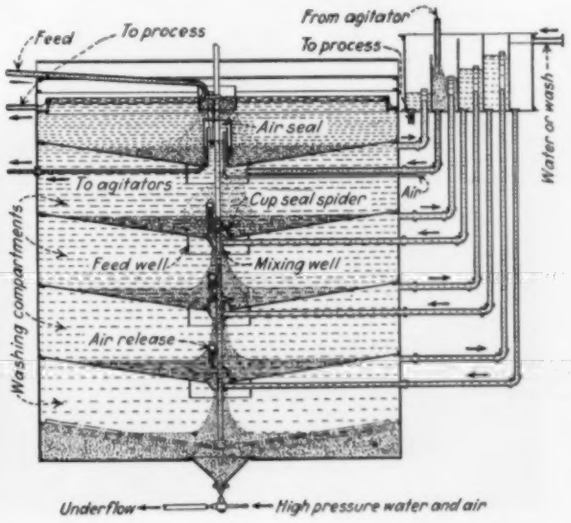


Left: Denver thickener

Below: Adka Saveall



Dorr combination washing thickener



the surface where they are removed continuously by a suction nozzle on the end of a revolving arm. Such savealls are available in nine standard sizes ranging from 8 ft. diameter to 21 ft. 6 in., and in corresponding capacities from 100 to 1,100 g.p.m.

Another feature of the Dorr exhibit will be a variation of the company's standard type washing thickener in which the top or primary thickening compartment is sealed off from the four lower washing compartments and is equipped with a separate diaphragm pump for the removal of sludge. This machine is known as a combination type washing thickener and its purpose is to allow agitation or some other processing step to be placed between the thickening and the washing units and yet retain the advantages of constructing the two units as a single piece of equipment in which all rakes are driven by a single central shaft. An air seal is maintained where the shaft passes from the thickening unit to the washing unit. This detail, as well as the system for indirectly carrying the sludge from the top compartment to the second compartment, is sketched on page 675.

This company's new Multizone classifier will also be displayed.

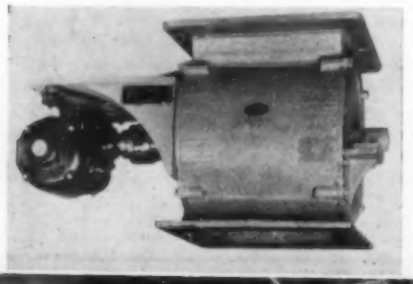
WEIGHERS AND FEEDERS

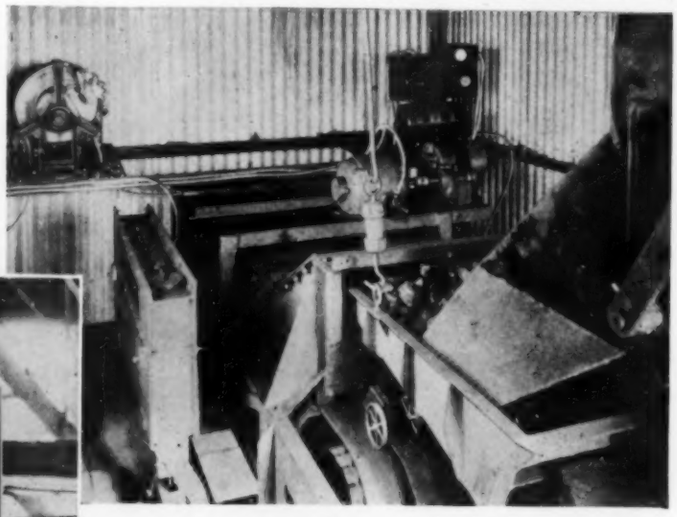
SEVERAL developments of the Exact Weight Scale Co., Columbus, Ohio, will be shown, including the new Speed sacking scale for bagging fertilizer, dry chemicals, and other free-flowing materials. The scale is available for various methods of mounting, and is provided with a type of bag holder suitable for both paper and fabric bags. New scales for checking and production weighing include a quick-stop model with a dial located at the end of the scale, having a capacity of 12 lb.; and a cross-tower type of over-and-under weight scale of special corrosion-resisting construction, having a capacity of 3 lb. The new Shadowgraph, an even-balance scale in which the shadow of the needle is projected on a scale, eliminating moving parts by more than 30 per cent and making parallax impossible, will also be shown.

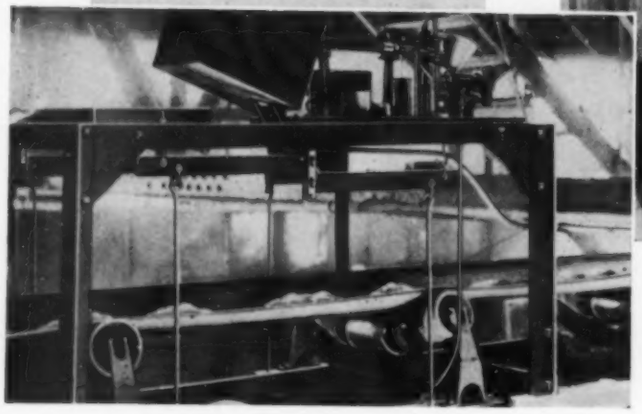
Weighing bulk material in transit on a conveyor belt is possible with the new conveyor scale developed by Fairbanks, Morse & Co., Chicago, Ill. In this scale the beam has no function except to indicate the load on a balanced section of conveyor. By electrical means it positions an integrating wheel against a cone driven by the belt. Electrical impulses controlled by the speed of the integrating wheel operate a counter showing total tonnage.

A new check weigher for filling small packages of difficultly packageable materials, known as the Auto Check Weigher, will be shown by B. F. Gump Co., Chicago, Ill. In one operation the machine weighs, check-weighs and fills the bags. An automatic bag-opening and holding device is featured.

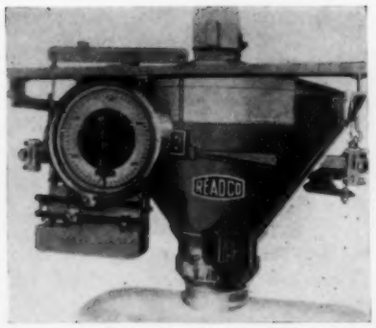
Both weighing and feeding through the use of vibrating equipment will be demonstrated by the Jeffrey Mfg. Co., Columbus, Ohio. The exhibit will comprise a closed circuit in which the company's new Jeffrey-Traylor Waytrol constant weight feeder will deliver to a vibrating spread feeder which in turn will discharge to an electric vibrating screen. This last will discharge to a vibrating conveyor and bucket elevator, thus completing the circuit. The Waytrol makes use of a synchronous weigh belt on a scale beam so pivoted as to receive material at

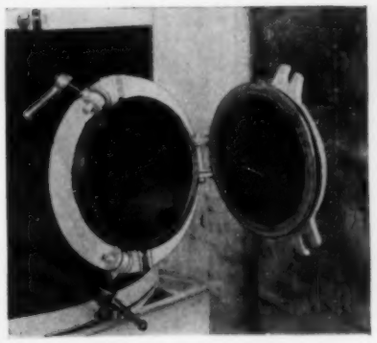


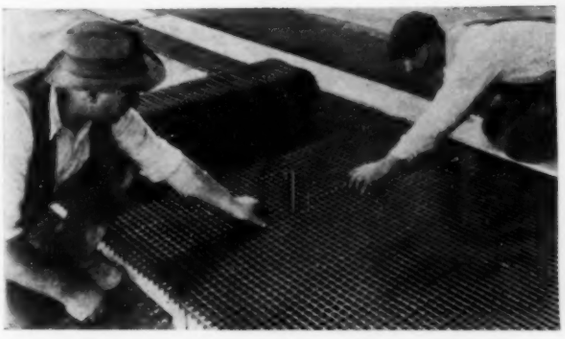




Above: Jeffrey-Traylor Waytrol electric weigher-feeder
Top Left: Sprout-Waldron feeder
Top Right: Exact Weight Shadowgraph
Left: Fairbanks-Morse integrating conveyor scale





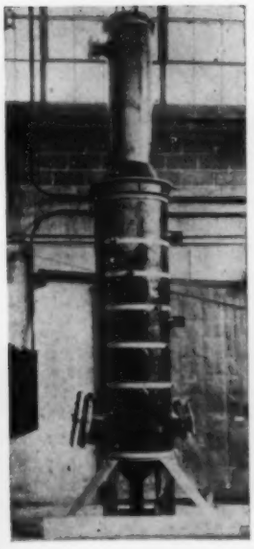


Top Left: Syntron rotary batch weigher

Top Center: Gump Auto Check weighter

Top Center: Readco dustless weigh hopper

Left: Laying Acme Floorsteel



Above: Special Haveg tower with detail of outlet at left

the more sensitive end. An automatic electric control operated by the scale controls the rate of feed of an electric vibrating feeder.

The new dustless automatic weighing hopper recently announced by Read Machinery Co., York, Pa., will be exhibited in the form of an operating model constructed of a transparent plastic material so that the return of dust to the hopper can be seen. The hopper, suspended from a scale mechanism, is provided with flues leading from an annular ring at the discharge to the top of the hopper. Through these flues dust displaced in dumping is returned to the top of the hopper. Weighing is controlled by an automatic, electrically operated cut-off.

Syntron Co., Homer City, Pa., plans to exhibit four new weighing machines, all of which employ electric vibratory feeders, controlled by a scale through the action of sensitive electric valves. Two new net-batch weighing types include one with a rotating weigh hopper for packaging. The other uses a tilting hopper for larger net batches of bulk material, and is used for mixing and blending. A new gross-batch type for filling containers is provided with an automatic starting switch while another gross-batch type is built for filling bags.

Recording at a distance the weight passing over a conveyor belt is the accomplishment of the new Chronoflo totalizing scale jointly developed by Toledo Scale Co., Toledo, Ohio, and the Builders Iron Foundry, Providence, R. I. The dial at the scale continuously indicates the scale load, while a separate totalized weight instrument may be situated at a remote point. Positive action is said to be attained through the elimination of all friction drives. Belt speed compensation is provided and an arrangement made for ready belt tare adjustment.

There will also be non-weighing feeders shown by other exhibitors. Allis-Chalmers Mfg. Co., Milwaukee, Wis., will demonstrate its new line of Utah electromagnetic feeders and screens, these devices operating on a new principle in which standard alternating current is used without auxiliary motor-generating equipment. Power for operation is provided from a small rectifier, together with an autotransformer and an amplitude adjusting switch.

A positive volume feeder for dry materials will be shown by Sprout, Waldron & Co., Muncy, Pa. A vane-type pulley revolved at constant speed within a cast iron case by a gear motor carries with it the full cubical capacity of its openings. Leakage is said to be impossible.

CONSTRUCTION MATERIALS, REFRACTORIES AND INSULATION

ACME FLOORSTEEL, a flexible steel grid for imbedding in the top layer of concrete floors to give a reinforced, quiet, non-skid surface, is a new addition to the specialties display of the Acme Steel Co., Chicago. The grid is made of formed strip steel held together by long removable pins and is supplied in any width desired.

Continental-Diamond Fibre Co., Newark, Del., has recently developed a series of standard sizes in its line of fume ducts, pipe, and rectangular and cylindrical tanks made from its phenol formaldehyde

plastic material, Haveg, and will feature these in its exhibit. Reaction vessels, absorption towers and other special processing equipment made of Haveg will also be displayed. Illustrated here is a specially designed Haveg tower with a cone bottom and special outlet.

Custoplast is a new acid- and alkali-proof tank lining which is being introduced this year by the Custodis Construction Co., New York. The material is a colloidal rubber preparation which is mixed with a powder and is applied in layers to concrete, steel or wood. Over these layers a liquid form of the material is sprayed and the resulting membrane is vulcanized. Another new protective coating known as Duro acidproof enamel will be displayed by the Electro-Chemical Supply & Engineering Co., Paoli, Pa. The material may be applied to concrete or metal surfaces, and is claimed to be resistant to practically all acids, most alkalis and the usual solvents. The Fish-Schurman Corp., New York, will have on display precision bore glass tubing of various sizes and cross sectional shapes. The tubing is made by the Jena Glass Works and is used in various precision instruments, such as flowmeters.

Several new ceramic bodies will be featured by the General Ceramics Co., New York. One of these has three to four times the thermal conductivity of regular stoneware. Two other bodies have increased densities as their outstanding feature. All are claimed to have excellent resistance to thermal shock. An improved form of the company's Cerawite, a white vitrified body covered with a brilliant white glaze, will also be displayed. The Hanovia Chemical & Mfg. Co., Newark, N. J., will show a number of complicated forms of its new solarizing-resistant fused quartz.

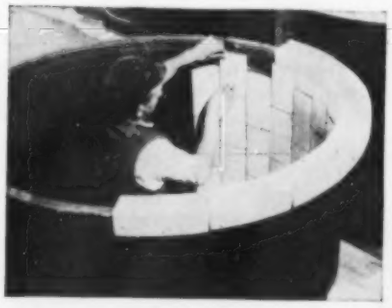
Haynes Stellite Co., New York, will exhibit a new alloy known as Hastelloy B for use under extremely severe corrosion conditions, primarily in the handling of hydrochloric acid. The new alloy is composed of nickel, molybdenum and iron, and is in this respect similar to Hastelloy A, except that the proportion of iron has been decreased and the molybdenum content increased.

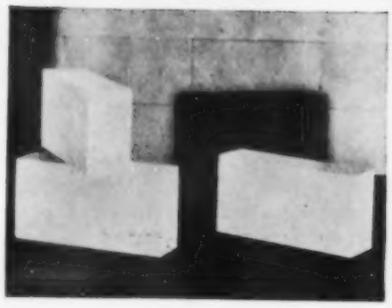
A new type of light-weight 2,000-deg. insulating brick of low thermal conductivity and heat capacity will be exhibited by Johns-Manville Corp., New York. Its properties are attained by using a special fibrous, light-weight, inorganic aggregate held together by a refractory clay. Also exhibited by the same company will be its new waterproof insulation for low temperature pipe lines. The new covering consists of waterproof rock wool sealed in an outer jacket of moisture-resistant material.

Kewaunee Mfg. Co., Kewaunee, Wis., will show two acidproof materials for laboratory table tops and sinks. Known as Kemite and Karcite, these consist of a porous ceramic body impregnated with coked bituminous substances and are said to be strong, light, and have an exceptionally low thermal expansion. The Metal Glass Products Co., Belding, Mich., will make its first appearance at the Exposition with a display of stainless steel and glass-lined processing and storage equipment for the fine chemical, food and drug industries.

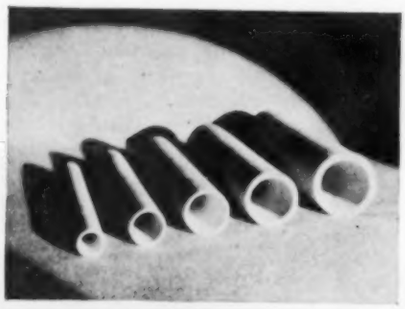
A new silica-free fused alumina tube of higher heat resistance than heretofore available will be announced for the first time by the Norton Co., Worcester, Mass. Developed for use in high temperature electro-metallurgical furnaces, the tube is said to stand up in continuous service at 1,800 deg. C. The Quigley Co., New York, has added a quick-setting product to its line of acidproof cements. This development is a moisture-proof cement suitable for use with acids under all conditions. Owing to its quick-setting property it is stated to be paricularly suitable for emergency repair work. This concern will also show its new 2,200-deg. refractory lagging material, Insulag, which is claimed to have high insulating and heat resistant properties, combined with low heat capacity. The material is quick-setting, water-resistant, and expands on drying.

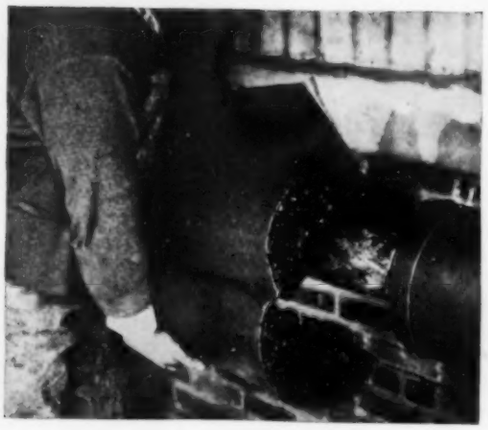
Installing Custoplast tank lining
New J-M 2,000-deg. insulating brick



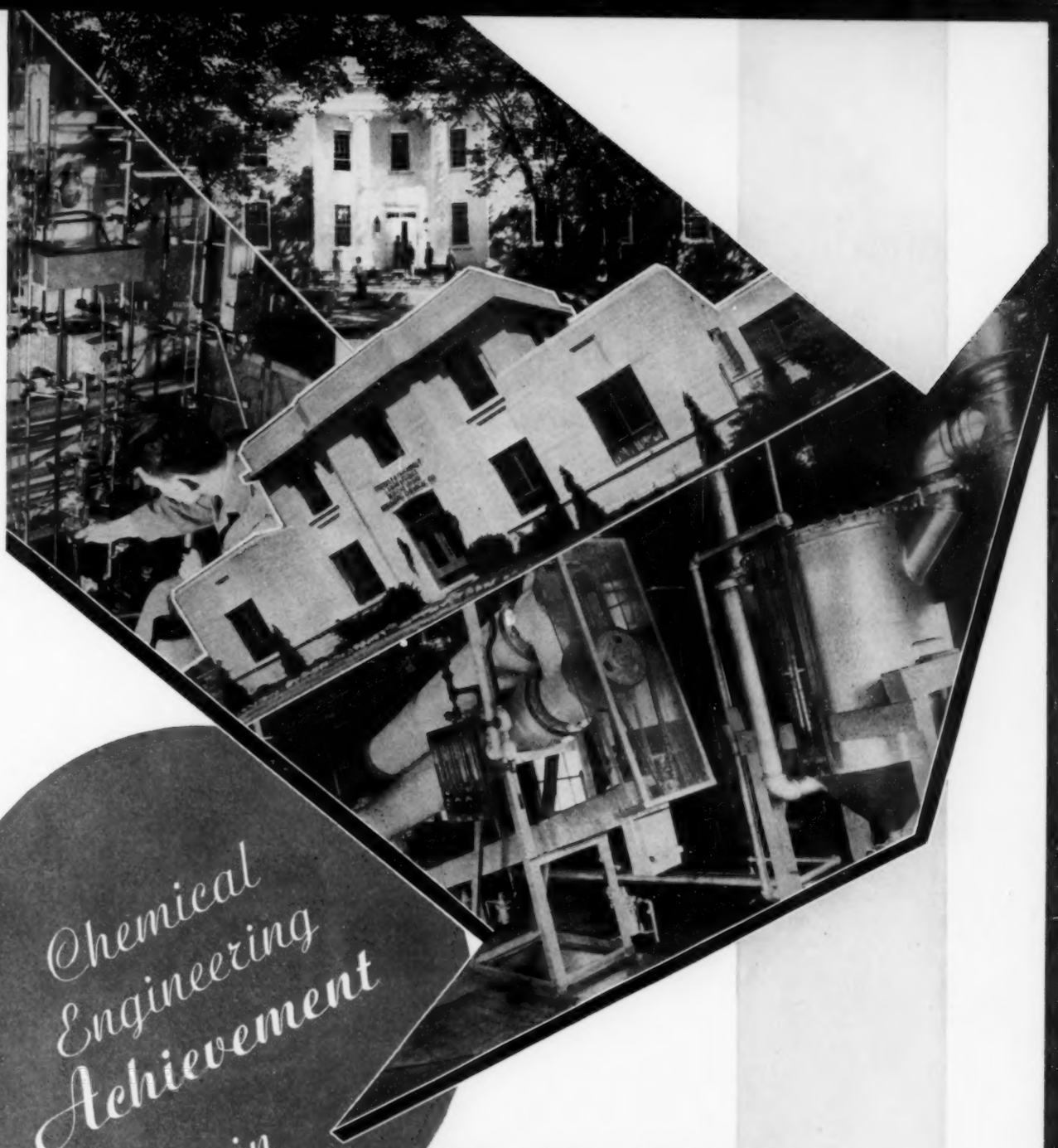


Norton high temperature furnace tubes
J-M cold pipe insulation





Towers built with Quigley black acidproof cement



Chemical Engineering Achievement in BUILDING FOR THE FUTURE OF THE PROFESSION

Education, research, development and operation are the building stones of the chemical engineering profession. Each rests upon the one before it and the foundation of the entire structure is education. On the following pages *Chem. & Met.* presents the views of a prominent educator and a well known industrialist on the job that lies ahead for education and industry in preparing new men — new foundations — up which will rest the future progress and growth of the profession and of the process industries.

Looking Ahead in Professional Development

By WARREN K. LEWIS

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IN THE EARLY HISTORY of the industrial revolution the initial engineering developments were mechanical. It is true that chemical industry soon began to expand, in a sense paralleling the early developments in the mechanical field, but, relatively speaking, for a long period the chemical industries played a very minor part. About the middle of the last century they began to grow at an accelerated pace, and analysis of modern industry not only shows that the chemical phases of industry are today of major importance, but indicates that they are likely to increase considerably.

The magnitude of the development of chemical industry, and even more the character of its achievements, suggests that our educational institutions have little need to apologize for the quality of the chemical engineering training they have offered in the past. On the other hand, study of the industrial situation points to the conclusion that the demands which industry will make upon the engineer in the years immediately ahead will be far more severe and in many ways different in character from the responsibilities placed upon him in the past. It is the duty of our educational institutions carefully to appraise the situation and attempt to give today the training needed by the engineers of tomorrow. While these changes developing in industry are numerous, there are two of them which promise to be of outstanding significance.

The first of these fundamental changes in the character of industry is the sharply accelerated rate of development of proccesses and products. Someone has pointed out that the time-history of practically every new idea in industry conforms to a given type of rate of growth curve. The birth of the idea is followed by a relatively long period during which progress is painfully slow. However, granting that the idea has sufficient merit, there finally comes a period of rapid expansion, which in turn is succeeded by a leveling off, corresponding to attainment of the ultimate place of the new development in the framework of industry. Thus, while the Bessemer converter was invented in 1856 and used on an increasing scale during the succeeding years, more than a quarter century later, in 1883, seventy per cent of all the pig iron produced in England was still puddled, but within the next five years this figure dropped to five per cent. In modern industrial developments the general shape of the rate of growth curve still remains the same, but the time axis is being greatly foreshortened. Industries develop, expand and mature far more rapidly than formerly. This accelerated pace of growth constitutes a most serious problem for the engineer. It reduces the time available for experimentation. It demands increased capacity for sound, fundamental analysis of highly complicated situations and far greater precision in quantitative design. Industry today demands in the engineer far higher technical capacity than a generation ago.

The second problem to which attention must be drawn is the rapidly increasing importance of the social factors in industrial work. It is no longer sufficient for the engineer to design and construct plants and develop processes which are efficient in utilization of materials, cheap in operation and high in quality of product. All this will still result in failure if the operations are of such a character that labor will be dissatisfied, the distributing organization disgruntled, or consumer psychology outraged. Not only must the social problems of industry be met, but in the years immediately ahead these problems promise to be the most important and the most difficult which industry will face. Furthermore, they cannot possibly be solved by a personnel department unacquainted with the physical and technical facts. They can only be mastered by engineers possessing an adequate grasp of both the technical relationships and their social implications.

No one familiar with the curricula of our engineering schools or the performance of engineers in industry can feel that our present educational technique can meet the needs of the situation. Our engineering schools must develop an education program adequate for the future. This program must give the student a firmer mastery of engineering technique, a far deeper appreciation of the significance of the social relations in industry and the power effectively to utilize this background of knowledge in the solution of practical problems.

One of the great engineers of the country has defined engineering as

This paper was originally presented at a conference on chemistry and chemical engineering held at the University of Delaware on October 16, 1937.

the art of the economic application of science to social purposes. The exact sciences underlying chemical engineering are mathematics, physics and chemistry, and the first problem in engineering education is grounding the student in them. Mathematics does not offer a serious problem, largely because the mathematicians have in recent years greatly increased the effectiveness of their methods of instruction. The engineering student comes to his professional work with a sound grasp of mathematical fundamentals and a reasonable ability to use mathematical technique in attacking the problems of the experimental sciences. Instruction in the latter, however, is unfortunatelly far less satisfactory.

The fields of physics and chemistry have expanded to such a degree that in too many cases instruction in these fundamental sciences has degenerated into an attempt to cover the ground, handing out a mass of information irrespective of the student's ability to master or even assimilate it. Any intellectual acceptance of the material presented cannot be due to appreciation of its background and hence of its meaning, but is a mere act of faith. Students thus trained have grandiose concepts but cloudy notions of their relations to the facts. Many a graduate student, who will talk glibly of the third law of thermodynamics, is unable to give any idea of the nature of energy or the reasons for assuming its existence, or will define temperature as what the thermometer reads. One can appreciate fully the impossibility of giving a complete definition of these ultimate, fundamental concepts, and yet deplore the haziness and uncertainty of the average science student in dealing with them. Students thus trained are unfit for engineering work.

Aims of an Engineering Education

The difficulty lies in failure to appreciate fully the function of science instruction, at least for engineering students. That function is primarily one of mental discipline. Engineering students need first a knowledge of the fundamental facts. They need in addition not so much a knowledge of fundamental theories as an appreciation of the facts on which those theories are based and the logic by which they are deduced. This alone can give them an understanding of the scope and the limitations of those theories.

One of the difficulties of engineering work lies in the complexity of the situations which must be faced. The science departments can help greatly in the training of the engineer if they will devote a significant fraction of the instructional time available to those branches of science characterized by complicated factual relationships.

Our educational program in engineering is undoubtedly weakest with respect to the social sciences. How unfortunate it is that the student finds it so difficult to appreciate the importance of human relationships and the capacity to handle them effectively. My years of contact with industrial research demonstrate that success in the direction of research depends much more on the ability of the head of the laboratory to handle its human problems than on his technical brilliance or grasp.

To succeed, he must keep his staff not only happy and contented but enthusiastic about their work. He must see that their spiritual energies are reserved for technical effort and are not taxed by economic worry, irritating personal contacts, or the depressing effects of an uncongenial intellectual atmosphere. Some of my own most careful professional work has failed because of my personal inability to secure the necessary cooperation from members of the organization through whom alone it could be brought to fruition. That my plans were technically sound was demonstrated later by other men more successful than I in overcoming the human difficulty.

Although they are in the curriculum, the social sciences require much more time than they are now accorded; mere classroom instruction will never accomplish results. The students must have practice in the art of human relationships. The time must come when every instructor in technical subjects, particularly in engineering branches, must consider it as much a part of his duty to direct and aid the student in understanding and the technique of effective human contacts as to give instruction along purely technical lines. Not only must the pioneering work done at Purdue in this direction be adopted elsewhere, but it must be expanded and developed to far higher degrees of helpfulness to the student.

The instruction in engineering itself should have two primary functions: the first is the correlation and integration of the material presented in the individual sciences as a basis for the technique of using it in the attack on practical problems, and the second, the development of facility in professional work through practical experience in laboratory and plant. The first is primarily a problem of classroom instruction, while the second is the engineering equivalent of the medical interneship.

Industrial Experience a Necessity

The furnishing of professional experience to the student is one of the weakest phases of engineering education. While laboratory instruction plays an important part in the engineering curriculum, it can never take the place of industrial experience. This is particularly true with regard to the matter of human relationships already emphasized. The day is coming when every engineering school of the first rank must furnish its students effective industrial contacts, in which they work under the direction of the faculty itself. Methods of this sort are, it is true, employed by a number of schools. Some of them have achieved considerable success but none of them have been able to impress themselves upon the profession with sufficint force to secure widespread adoption. Our engineering faculties can undertake few more promising tasks than the development of the methods of educational cooperation with industry.

There sometimes comes to a profession a period of outstanding opportunity for human service. Two thousand years ago the legal profession found such an opportunity in the development of Roman law. To the middle ages, priest and architect were able to render a unique service, the value of which has persisted long beyond the age that gave it birth. The last century has witnessed an extraordinary growth and recognition of the function of the physician, and the medical profession has taken advantage of it to make an unexcelled contribution to the development of a finer civilization. Now, the signs of the times point to the conclusion that the decades immediately ahead will offer the engineering profession potentialities for service of a quality and scope hitherto undreamed.

Making Tomorrow's Chemical Engineers

By A. E. MARSHALL
CONSULTING CHEMICAL ENGINEER
NEW YORK CITY

WE WHO FOLLOW the still young profession of chemical engineering are perhaps fortunate in that the industries we serve have not yet reached the fullness of their development, and therefore our discussions of educational and training needs do not have to be based on preserving whatever professional standing has up to this time been accorded chemical engineers.

Professor Lewis has expressed in the pages preceding this the view that most of the education and training facilities available to the would-be chemical engineer are hardly adequate for present day requirements and seem quite inadequate for future demands.

Let us take a look at the average newly graduated chemical engineer of the 1937 vintage. He is twenty to twenty-two years old and has a bachelor of science degree in chemical engineering acquired after four years residence in a college or university.

He arrived at the university with a record of eleven or twelve years of schooling, and certificates to prove reasonable competency in English, mathematics up to advanced algebra and trigonometry, one or perhaps two foreign languages and elementary physics or chemistry.

It is rather unlikely that up to the time of entrance he had acquired any real experience in organized industrial effort. He probably was still schoolboy raw material with the schoolboy viewpoint of business or professional life.

More likely than not his decision to study a branch of engineering was reached in the last few months of high school. But even if youth could determine its trends two or three years before entrance into a university, the high schools, as presently constituted and arranged, could not differentiate their curricula to provide more specific training for that small percentage of youths already thinking of engineering as their future profession. So the university is given the task of beginning and completing its contribution to an engineering education in one hundred and fifty weeks.

I do not believe a university can turn out usefully and satisfactorily trained engineers—at least from the raw material now supplied them—in such a brief period. And when we consider the limitations now being placed on parents' earnings by that "more abundant life" so beloved by our fireside orator, it does not seem feasible, at least in the near future, to extend generally four year engineering courses to six years. I fear that such a plan might result in removing some of the most promising material before completion of the full course and, as a corollary, the placing of an undesirable emphasis on family circumstances.

Rather, it is my opinion that some large part of the engineering students should be drawn from special preparatory schools—technical high schools or institutes if you will—where the two years prior to university entrance would be principally devoted to the study of English, mathematics, economic history, chemistry, physics, mechanical drawing and shop, and a foreign language, preferably German.

If arrangements could be worked out so that in the summer preceding university entrance these technical school youths could be employed in industry (and personally I would not care very much about the relation of the industry to the precise type of engineering education contemplated), they would not be schoolboy material entering an engineering school as an extension of schoolboy days, but some proportion would be willing neophytes ready to understand and undertake what should be their pride of accomplishment—a reasonably well-rounded education in engineering fundamentals.

Special preparatory schools seem a long way off, but as a practical intermediate step there seems to be merit in a five year course for the degree of Bachelor of Science in Engineering, with curricula so devised that men could graduate in four years with a Bachelor of Arts degree if circumstances made the fifth year impossible. Also, as the personnel departments of industries are reaching back with offers of positions to third year men, if and when they graduate with a Bachelor of Science degree would it not be an appropriate and equitable arrangement for industry to foot the bill for the fifth year of its selected men?

I can agree with everything Professor Lewis has said on the inadequacy of available training for engineering students in the social sciences, but here again I have the feeling that some participation in organized industrial effort, preferably beginning in the summer before entrance and in some of the succeeding university years would quicken interest in the study of psychology, sociology and even economics by making them real instead of abstract subjects.

It is unfair to permit youth to be a schoolboy until a degree is secured and then suddenly to demand an ability to understand men and be welcomed as a man among men.

This paper originally presented at University of Delaware on Oct. 16, 1937, as discussion of preceding paper by W. K. Lewis.

Accrediting of Engineering Schools

IT HAS BEEN pointed out in the two preceding articles in this section that the demands upon schools supplying chemical engineers to industry are both changing and increasing. Recognizing this some years ago, the American Institute of Chemical Engineers felt that a means of establishing certain minimum requirements for recognized curricula in chemical engineering would be a desirable and effective step in building for the future of the profession. Hence it was that in the three years from 1922 to 1925 the Institute's committee on chemical engineering education formulated a definite basis for the official accrediting of chemical engineering curricula in the United States. A classification of courses was developed, a tentative norm for comparisons set up, and the curricula of 65 institutions were studied from this new viewpoint with the result that in 1925 fourteen institutions were unanimously placed on the accredited list. To date this number has been increased to 28.

After its successful pioneering of the accrediting program, A.I.Ch.E. two years ago joined hands with the other national engineering societies in a plan to substitute a single accrediting system for the uncoordinated and needlessly overlapping procedures then current. The central agency chosen as executor and administrator of the plan was the then three-year-old Engineers' Council for Professional Development. The participating groups were American Institute of Chemical Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, Society for the Promotion of Engineering Education, and the National Council of State Boards of Engineering Examiners.

In developing its accrediting program, the objectives of the E.C.P.D. committee on engineering schools have been "to formulate criteria for colleges of engineering which will insure to their graduates a sound educational background for practicing the engineering profession," and

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IVAN C. CRAWFORD, University of Kansas, representing A.S.C.E.

HARRY A. CURTIS, Tennessee Valley Authority, representing A.I.Ch.E.

P. H. DAGGETT, Rutgers University, representing National Council of State Boards of Engineering Examiners

A. A. POTTER, Purdue University, representing A.S.M.E.

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H. M. MERKER, Parke, Davis & Co., Detroit, Mich.

W. A. SCHMIDT, Western Precipitation Co., Los Angeles, Calif.

E. P. STEVENSON, Arthur D. Little, Inc., Cambridge, Mass.

to give recognition to those institutions prepared to teach engineering according to acceptable standards. Accrediting has been based on both qualitative and quantitative criteria. The procedure involves the use of an extensive questionnaire and a personal visit to each institution by a committee of engineers. Participation of the educational institutions is voluntary and inspection is made only at their invitation and their expense. The aim of E.C.P.D. has not been to impose restriction or standardization upon engineering colleges. On the contrary, it has tried to preserve the independence of action of individual institutions and to promote thereby the general advancement of engineering education.

The present accrediting system as carried out by E.C.P.D. divides the country geographically into seven districts, each having in it at least one member of each of the sub-committees. Thus the sub-committee on chemical engineering curricula consists of nineteen members residing in various parts of the country. A school desiring accrediting of any or all of its engineering curricula communicates directly with the E.C.P.D. committee on engineering schools. In the course of its regular procedure, the committee will arrange for inspection of the educational facilities of the school by a regional sub-committee.

As its general basis for accrediting, E.C.P.D. has set up the following principles and considerations:

I. Purpose of accrediting shall be to identify those institutions which offer professional curricula in engineering worthy of recognition as such.

II. Accrediting shall apply only to those curricula which lead to degrees.

III. Both undergraduate and graduate curricula shall be accredited. (Accrediting program at present embraces undergraduate curricula only.)

IV. Curricula in each institution shall be accredited individually. For this purpose, E.C.P.D. will recognize the six major curricula: chemical, civil, electrical, mechanical, metallurgical, and mining engineering—and such other curricula as are warranted by the educational and industrial conditions pertaining to them.

V. Curricula shall be accredited on the basis of both qualitative and quantitative criteria.

VI. Qualitative criteria shall be evaluated through visits of inspection by a committee or committees of qualified individuals representing E.C.P.D.

VII. Quantitative criteria shall be evaluated through data secured from catalogs and other publications, and from questionnaires.

VIII. Qualitative criteria shall include the following:

(1) Qualifications, experience, intellectual interests, attainments, and professional productivity of members of the faculty.

Schools Accredited in Chemical Engineering by A.I.Ch.E. and E.C.P.D. (with year accredited)

Armour Institute of Technology, 1925
California Institute of Technology, 1926
Carnegie Institute of Technology, 1925
Case School of Applied Science, 1925
University of Cincinnati, 1925
Columbia University, 1925
Cornell University, 1936
Drexel Institute, 1936
University of Illinois, 1933
Iowa State College, 1925
State University of Iowa, 1926
Lehigh University, 1932
University of Louisville, 1935
Massachusetts Institute of Technology, 1925
University of Michigan, 1925
University of Minnesota, 1925
New York University, 1935
Ohio State University, 1925
University of Pennsylvania, 1936
Pennsylvania State College, 1936
University of Pittsburgh, 1931
Polytechnic Institute of Brooklyn, 1925
Princeton University, 1934
Purdue University, 1933
Rensselaer Polytechnic Institute, 1925
University of Washington, 1926
University of Wisconsin, 1925
Yale University, 1925

(2) Standards and quality of instruction:

(a) In the engineering departments.

(b) In the scientific and other cooperating departments in which engineering students receive instruction.

(3) Scholastic work of students.

(4) Records of graduates both in graduate study and in practice.

(5) Attitude and policy of the administration toward its engineering division and toward teaching, research, and scholarly production

IX. Quantitative criteria shall include the following:

(1) Auspices, control and organization of the institution and of the engineering division.

(2) Curricula offered and degrees conferred.

(3) Age of the institution and of the individual curricula.

(4) Basis of and requirements for admission of students.

(5) Number of students enrolled

(a) In the engineering college or division as a whole.

(b) In the individual curricula.

(6) Graduation requirements.

(7) Teaching staff and teaching loads.

(8) Physical facilities. The educational plant devoted to engineering education.

(9) Finances: investments, expenditures, sources of income.

To these general requirements established by the E.C.P.D. committee on engineering schools, the A.I.Ch.E. sub-committee has added the following supplementary considerations applying particularly and exclusively to the chemical engineering curriculum:

1. Adequate and competent faculty for teaching chemical engineering.

2. Satisfactory curriculum, including an appropriate number and scope in courses of chemical engineering, chemistry, other branches of science and engineering and cultural subjects.

3. Adequate and appropriate facilities for laboratory and library work in chemical engineering, as well as in chemistry.

4. Satisfactory relationship of the chemical engineering department and curriculum to the department of chemistry and to other divisions of engineering and science, and a proper support of chemical engineering by the general executive and administrative officials of the institution.

5. Regular graduation of a reasonable number of students with bachelors' or advance degrees who by subsequent experience give evidence of suitable training during their collegiate affiliation with the institution.

Both E.C.P.D. and A.I.Ch.E. wish it to be emphasized in connection with these sets of standards that neither agency has set up a "required" curriculum or "required" laboratory equipment, or "required" library. Every case is considered as an individual one, and it is the integrated situation in respect to the faculty, facilities and curriculum which is judged. The aims of the A.I.Ch.E. committee are best expressed in these words of its Ex-Chairman Harry A. Curtis: "The committee on chemical engineering education has always regarded the matter of final recommendation for accrediting as a minor phase of its activity. Its chief work is cooperation with educational institutions seeking to improve their chemical engineering curricula, facilities or faculties. The committee will not proffer unsought advice or express unadvised opinions; but it stands ready to do anything it may in the cause of improving chemical engineering education."

Chemical Engineering Achievement in PRODUCTS OF THE PROCESS INDUSTRIES

Almost every one of the process industries has developed a number of new products as a result of intensive research during the two year period since the last "Chem. Show." Many of these products have had world-wide significance, some have necessitated the construction of new plants, and a few have antiquated old methods and materials. Outstanding are the developments in plastics, but following closely are new textile chemicals, rubber chemicals, phosphorus compounds, finishes and dyes. Because of the physical impossibility of giving space to all the new products, the editors of *Chem. & Met.* have selected a few which seem to reflect the important trends.

Products of Recent Progress In Chemical Engineering

During the past two years an enormous number of new materials has been put on the market by the process industries. Some of the more representative types are briefly presented in these pages

Adhesives

The use of the new synthetic polybasic acid, Petrex (a development of Hercules Powder Co.), has permitted the preparation of thermoplastic resin adhesives without the use of plasticizers. The resinous adhesives are resistant to discoloration from light, resistant to moisture, and to embrittlement. They can be applied thermoplastically without solvent to obtain unusually strong laminations of various materials. However, these adhesives dissolve readily in ring hydrocarbons and esters, such as toluol and ethyl acetate, so that solvent application can be readily accomplished.

Adhesives which can be applied in molten state, and which retain flexibility at low temperatures, can be made with ethyl cellulose and resins. These adhesives are heat stable, waterproof, and tough, they represent an important contribution by Hercules to the adhesives field. They are suitable for use on paper, leather, cloth, metal foil, wood and other surfaces.

Revertex has been used as the base of the new adhesive and caulking material for the building trades known as Plasoleum, by the Revertex Corp. of America. Latex in the base gives it the water proofing properties of rubber as well as durability and resistance to temperature change. Plasoleum is mixed at the place where it is to be used so as to prevent waste. Besides its use as a filler for expansion joints in buildings and as a caulking material for window frames, the new product is adaptable as an adhesive for wood, linoleum, rubber, cork and tile on concrete or steel.

A new adhesive used for covering metal with rubber has been developed by the Bloomingdale Rubber Co. Because it will adhere at high temperatures as well as low, it has been named Thermotite adhesive. With it rubber may be bonded to any kind of metal, glass, plastic, or hard rubber, etc. The side of the adhesive to which the rubber must be applied is covered with Holland cloth in order to get better contact. The rubber and adhesive are applied to the metal surface by vulcanization, after the metal surface has been freed of loose scale and oil. Thermotite is flat cured under pressure, 13 min. at 60 lb. being sufficient.

Bactericide

A new bactericide which is of interest to the chemical engineer has been developed by Oakite Products, Inc., and is known as Oakite Airefiner. Its principal use is to sterilize the recirculated water in an air conditioning system. It is soluble in water, does not corrode metal surfaces, is non-toxic, odorless and colorless. The manufacturers also recommend it for use in tanks which hold large supplies of water over a long period of time. There it prevents fouling of water and eliminates slime.

Cellulose Sponge

A man-made sponge produced from highly purified wood and cotton cellulose pulp has been developed by the Cellophane Div. of E. I. du Pont de Nemours & Co., Inc. It is said to be much more efficient than a natural or rubber sponge because it will absorb water to 95 per cent of its own cubical content or roughly 25 times its own weight. It is more uniform in quality, size, shape and texture than a natural sponge; it can be sterilized and cleaned with boiling water; it can be made in convenient shapes; and it floats.

Compounding Ingredient

Vistanex, a polymerization product of a straight-chain hydrocarbon has recently made its entry into the field of "rubbery" compounds. It is made in two forms—Vistanex No. 6 and Vistanex Medium. The former compound is a soft, tacky plastic which may be blended with waxes, pitches and latex, or melted with resins to form improved adhesives. The latter form resembles white crepe rubber and it has been found very useful for compounding with rubber, neoprene or Thiokol. It is said to increase acid resistance, improve electrical characteristics, and lessen vegetable oil swelling. Vistanex is soluble in petroleum distillates, toluol and turpentine, and it is insoluble in alcohols, esters, ketones, vegetable oils, etc. It is not subject to aging but it may be oxidized slowly with free chlorine. Vistanex is manufactured by the Advance Solvents & Chemical Corp.

Detergent

A new detergent has been made available during the past two years by the production of commercial sodium orthosilicate. It is said to have many advantages over other detergents used heretofore: more economical, faster action, reduced bleach consumption, and increased scope of usefulness.

The detergent is now available in two forms. The Pennsylvania Salt Mfg. Co. is credited with developing its product, anhydrous sodium orthosilicate under the trade name Orthosil, early in 1936. The company is now manufacturing Orthosil (with

the formula Na_4SiO_4) in large quantities at its Wyandotte, Mich., plant.

The other form is a hydrated sodium orthosilicate (formula $2Na_2O$-SiO_2-$6H_2O$) manufactured by the Standard Silicate Division of the Diamond Alkali Co. Its production was announced early this year.

Dye and Pigment

Monastral Fast Blue BS is the name given to a new and outstanding pigment dye introduced in this country by the Dyestuffs Division of E. I. duPont de Nemours & Co., Inc. Hailed by some chemists and engineers as the greatest development since synthetic indigo, it has invaded three major industries: textile dyeing, paint manufacturing and ink making.

The pigment, manufactured in both the powder and paste forms, produces extremely brilliant shades of blue. It is not water-soluble and it is particularly resistant to soaps, to the sun, and most other color-destroying agents. It lends itself excellently to the manufacture of printing inks for lithography, letter press, tinplate and other fine printing. In the textile industry it is finding new uses every day.

Emulsifier

A new soapless emulsifying agent named Glycoride has been introduced by Glyco Products Co., Inc. Its chemical name is glycol glyceryl stearate. It is a white wax-like solid with a melting point of 54-59 deg. C. Completely dispersible in hot water, it yields a stable fluid emulsion upon cooling. Glycoride has a pH of 5.9, and emulsions made with it have a pH of 6.4. The emulsifier, free from soap, alkalis, amines, and inorganic salts, has found use in cosmetics, polishes, textiles, leather, and paper.

Ethyl Cellulose

Ethyl cellulose was first proposed as a commercial material by Dr. Otto Leuchs and Dr. Leon Lilienfeld in 1912 but was not made on a commercial scale in this country until about two years ago when a plant was completed by the Hercules Powder Co. at Parlin, N. J., and more recently by Dow Chemical Co. at Midland, Mich. Earlier this ether of cellulose and ethanol had been imported from Germany by Advance Solvents and Chemical Co.

Ethyl cellulose can be furnished in various viscosities, depending on the degradation to which the cellulose has been submitted at any stage in its processing. An outstanding characteristic of the material is its miscibility with a wide range of solvents, resins, waxes, oils, and plasticizers, with which incorporation is often effected by heat alone.

A great number of the uses so far developed for ethyl cellulose depend on its toughening action on oils, waxes, and resins; its flexibility; and the fact that it can often be applied by heat. For further information refer to *Chem. & Met.*, Vol. 44, p. 31, 1937.

Flexible Finish

Duflex, a new product of Maas & Waldstein, is a flexible finish for application to high grade metal products. It is said to withstand any amount of flexing or bending without cracking. According to the manufacturer, the finish produced by Duflex application is similar in gloss and wearing qualities to the finish produced by cemented celluloid.

Organic Base

A stable, non-volatile organic base as strong as sodium hydroxide and possessing many unique properties has been announced by the Röhm & Haas Co. The applications for Triton B are: for saponification of oils and fats, esters, gums and waxes; in the production of accelerators, antioxidants, antiseptics, detergents and pharmaceuticals. Also, it is suitable as a solvent for cellulose.

Plasticizer

A new rubber plasticizing agent, napthyl-beta-mercaptan, was introduced early in 1937 by E. I. duPont de Nemours & Co., Inc., under the trade name R.P.A. No. 2. According to a paper presented before the American Chemical Society by A. H. Nellen, chief chemist of the Lee Tire & Rubber Co., R.P.A. No. 2 shortens milling time and decreases power consumption to such an extent that savings in milling costs up to 60 per cent may be realized with the use of ½ per cent of the plasticizer.

Plastic Wood

One of the most interesting developments that has come out of the plastics industry in sometime is the plastic wood just announced by the Masonite Corp. Except for a film of synthetic resin on the two surfaces and a small amount of black dyestuff, this product is 100 per cent wood. The dyestuff is sometimes dispensed with if a deep black is not required in the interior. The natural color is brown changing to black on curing. It is available in two grades: the uncured material is known as Masonite Benaloid and the cured material as Masonite Benalite.

Rapid Drying Ink

Recent years have seen much interest in the development of rapid drying inks for printing. One of these inks is Vaporin, a product of Interchemical Corp. It comprises essentially: a solid resin, a high boiling solvent, and coloring pigment. The solvent is driven off by heat and the resin is restored to its original solid state. Unlike the varnish of the usual letterpress and offset inks which is changed by oxidation into a hard or dry film, the new rapid drying ink varnish merely undergoes a physical reaction in its rehardening process, or the so-called drying of its ink film.

Resinous Pitch

A resinous pitch, Nuba, has recently been developed by the Neville Co. of Pittsburgh. It is available in three grades divided according to melting point range. The dark, thermal-softening plastic is tough and elastic. It is almost entirely soluble in aromatic solvents and partly soluble in warm petroleum solvents. It is said to be suitable for use in roof coatings due to less cold flow and less brittleness at low temperatures than many roofing pitches.

Safety Glass

Vinal is the name given a new type of sandwich plastic material used in safety glass. The new product represents a joint effort by Carbide and Carbon Chemicals Corp. at Mellon Institute and Pittsburgh Plate Glass Co.'s Duplate research laboratory. The high test laminated safety glass, after being cracked will stretch and bend upon further impact. The plastic has rubber-like stretching qualities and extremely high tensile strength. This safety glass is particularly important at low temperatures, for it is about 10 times as resistant to break-

age as other glasses at 10 degrees below zero and five times as resistant at 70 deg. F. For more details see *Chem. & Met.*, Vol. 43, p. 177, 1936.

Solvent

A very interesting new product is the cyclic ether-amine, Morpholine. It is a mild base and, with fatty acids, readily forms soaps which are excellent emulsifying agents for use in polishes, paper coatings, paints and lacquers. The moderate volatility of Morpholine causes it to evaporate gradually from the drying emulsion film, making the latter resistant to subsequent water treatments. It has a boiling point of 128 deg. C. and is miscible with water in all proportions.

Being an ether, an amine and having a ring structure, Morpholine is a powerful solvent for a host of materials including resins, dyes, waxes and other substances. It also lends itself to synthetic reactions characteristic of cyclic secondary amines. The new product is manufactured by the Carbide and Carbon Chemicals Corp.

Synthetic Resins

Another thermoplastic resin, Paradene, has just been placed on the market. It is a low-priced coal-tar resin, available in three grades, melting between 75–99 deg. C., 100–124 deg., and 125–140 deg. This Neville Co. development is brown to black. It is completely soluble in coal-tar solvents and may be formulated into varnishes containing 100 per cent mineral spirits. Paradene softens upon heating, becoming plastic below its melting point and fluid above it. It is stable to heat up to 190–200 deg. C., slow decomposition resulting upon prolonged heating above these temperatures. It is chemically neutral and inert, and resists water, alkalis, and dilute acids, as prolonged immersions have shown.

Polymerization products of acrylic acid and its derivatives are known as acrylic resins. These resins are available in the form of solutions in organic solvents, in aqueous emulsions, or as solid thermoplastics. The controllable modifications of polymerization conditions and chemical constitution afford the manufacturer opportunities to vary the properties of the acrylic resins so that they can be adapted to widely diversified applications.

Their colorless transparency and resistance to aging and weathering are outstanding characteristics of Plexiglas and the other acrylic plastics made by Röhm and Haas Co. Due to these excellent properties, the plastics are finding applications for which synthetic plastics had not previously been considered. They are now available in plane and curved sheets in thicknesses of 0.06 in. to 0.50 in. in sizes up to 36 in. x 48 in. Rods, tubes, and molding materials made of these plastics are under development.

Lucite is E. I. duPont de Nemours & Co.'s trade name for a methyl methacrylic acid. It is sold as a cast resin in the form of sheets, rods and tubes, and as a thermoplastic molding powder. It is available as a crystal clear product and in a wide variety of brilliant transparent, translucent and opaque colors.

Since the water absorption of Lucite is extremely low, it is unaffected by water solutions of mineral salts and alkalis. It is resistant to concentrated hydrochloric acid and 50 per cent sulphuric acid at room temperature. It is insoluble in straight chain hydrocarbons, alcohols, ethers, and in most fats, oils and waxes. However, this product is readily dissolved by lower ketone and ester solvents, and mixtures of aromatic hydrocarbons with small amounts of alcohols. Although it is difficult to ignite, when heated by direct flame it will support combustion.

Synthetic Vitamin

A new product recently introduced by Chas. Pfizer & Co. is ascorbic acid—also known as cevitamic acid—an organic chemical of the empirical formula, $C_6H_8O_6$. This synthetic substance has all the characteristics of natural vitamin C, and because it is now cheaper, equivalent for equivalent, than the natural product in the form of citrus fruit juices, it is already used to a considerable extent therapeutically. The appearance of ascorbic acid on the commercial market has been made possible largely by the cheaper and more plentiful supply of sorbitol resulting from the new electrolytic process recently developed by the Atlas Powder Co. for producing that substance from corn sugar. Sorbitol is the starting point in the synthesis of sorbose, which in turn is used in making the synthetic ascorbic acid.

Tetraphosphoric Acid

The Monsanto Chemical Co. recently announced a new product in the phosphate chemical field, tetraphosphoric acid ($H_6P_4O_{13}$). This compound has hitherto been known only in the laboratories. Its commercial production has been hailed as an important achievement. Tetraphosphoric acid is a water-white, viscous liquid which will neither crystallize at a temperature as low as —40 deg. F. nor decompose when heated to 212 deg. F. It has a P_2O_5 content as high as 84 per cent, whereas the P_2O_5 content of orthophosphoric acid is in the neighborhood of 72 per cent. Tetraphosphoric acid bears the same relation to orthophosphoric acid that oleum bears to sulphuric acid; consequently, its high concentration is expected to prove a boon to phosphoric acid users.

Wetting Agent

As a result of investigation in the field of synthetic organic chemistry, hitherto unobtainable alcohols of high molecular weight have been made available in commercial quantities by the Carbide and Carbon Chemicals Corp. Because of their giant molecular size, these synthetic alcohols are not soluble in water. They can be converted into products which will readily dissolve in water and which impart to such aqueous solutions very pronounced properties of detergency, emulsifying action, penetration and wetting-out of large surface areas. A small addition causes water to penetrate whatever it touches almost instantly. These compounds are available under the name of Tergitol.

Many profitable applications of these materials are presented in the process industries, since most of the operations involve the use of aqueous solutions. The surface activity of these wetting agents is most desirable

White Pigment

A new modification of titanium dioxide pigment is Ti-Sil, a titanium-silicate base pigment produced by Krebs Pigment & Color Corp. It is intended for use in exterior white paints. While it provides both a prime pigment and well chosen extenders as one combination pigment, it is not intended for use as a sole pigment in formulations for outside paints.

Principal Products and Plants Of American Chemical Industry

In this presentation an attempt has been made to set forth the present physical set-up of the domestic chemical industry by enumerating the principal companies, their products, and important plants

Company and principal subsidiaries	Acids	Nitrogen and compounds	Sodium compounds	Potassium compounds	Alum and Al. compounds	Chlorine and bleaching compounds	Coal-tar products	Plastics and pyroxylin products	Compressed gases	Pigments, paints and varnishes	Pharmaceuticals	Solvents	Misc. chemicals	Year of Inc.	Location of principal plants and number of plants
Air Reduction Corp	....	●	....	....	....	....	....	....	●	....	....	....	....	1916	Jersey City, N. J.; Chicago, Ill. (136)
Allied Chem. & Dye Corp.	....	....	....	....	....	....	....	....	....	....	....	....	....	1920	
The Barrett Co.	....	●	....	....	....	....	●	....	....	●	....	●	....	1903	(32)
General Chemical Co.	●	●	●	....	●	....	....	....	....	....	....	....	●	1899	Buffalo, N.Y.; Marcus Hook, Pa.; E, St, Louis, Ill, (23)
National Aniline & Chem. Co., Inc.	....	....	....	....	....	....	●	....	....	....	....	....	....	1917	Buffalo, N. Y.
Semet-Solvay Co.	....	....	....	....	....	....	●	....	....	....	....	....	....	1916	Syracuse, N. Y.
The Solvay Process Co.	....	●	●	●	....	●	....	....	....	....	....	....	....	1881	Syracuse, N. Y.; Detroit, Mich.; Baton Rouge, La. (3)
American Agricultural Chem. Co.	●	....	●	....	....	....	....	....	....	....	....	....	●	1913	Detroit, Mich.; Carteret, N. J.; Baltimore, Md. (29)
American Aniline Products, Inc.	....	....	....	....	....	....	●	....	....	....	....	....	....	....	Lock Haven, Pa.; Nyack, N. Y.
American Cyanamid Co.	●	●	●	●	....	....	●	●	....	....	●	●	●	1907	Warners, N. J., Niagara Falls, N. Y. (4)
Amalgamated Phosphate Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1911	
American Cyanamid & Chem. Corp.	●	●	●	●	●	●	●	●	....	●	....	●	●	1929	Niagara Falls, N. Y.; Valdosta, Ga.; Waterbury, Conn. (5)
Calco Chemical Co.	●	●	●	....	....	....	●	....	....	....	●	....	●	1929	Bound Brook and Newark, N. J. (2)
Rezyl Corp.	....	....	....	....	....	....	....	●	....	....	....	....	....	1928	
American I. G. Chemical Corp.	....	....	....	....	....	....	●	....	....	....	....	....	●	1929	
General Aniline Works, Inc.	....	....	....	....	....	....	●	....	....	....	....	....	....	....	Albany, N. Y.; Grasselli, N. J. (2)
American Potash & Chem. Corp.	....	....	●	●	....	....	....	....	....	....	....	....	●	1926	Trona, Calif. (1)
Ansul Chemical Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	....	Marinette, Wisc.; Modesto, Calif. (2)
Atlas Powder Co.	●	....	....	....	....	....	....	●	....	●	....	●	●	1912	Stamford, Conn.; Wilmington, Del. (14)
Bakelite Corp.	....	....	....	....	....	....	....	●	....	●	....	....	●	1922	Bound Brook, N. J (1)
Baker Chemical Co., J. T.	●	●	●	●	....	....	....	....	....	....	....	....	●	1904	Phillipsburgh, N. J. (1)
Barium Reduction Corp.	....	....	●	....	....	....	....	....	....	....	....	....	●	1923	Charleston, W. Va. (1)
Bay Chemical Co.	●	●	....	....	....	....	....	....	....	....	....	....	●	....	Weeks Island, La. (1)
Binney & Smith Co.	....	....	....	....	....	....	....	....	....	●	....	....	●	1902	Easton, Pa. (1)
Carus Chemical Co.	....	....	●	●	....	....	....	....	....	....	....	....	....	....	La Salle, Ill.
Catalin Corp. of America	....	....	....	....	....	....	....	●	....	....	....	....	●	1929	Perth Amboy, N. J. (1)
Columbian Carbon Co.	....	....	....	....	....	....	....	....	●	●	....	....	....	1921	Sunray, Tex.; Mormouth Jct., N. J. (21)
Commercial Solvents Corp.	....	....	....	....	....	....	....	●	●	●	....	●	●	1919	Terre Haute, Ind.; Peoria, Ill. (7)
Consolidated Chem. Industries	●	●	....	....	●	....	....	....	....	....	....	....	●	1929	San Francisco, Calif.; Boston, Mass.; Houston, Texas (6)
Cooper & Co., Chas.	●	....	....	....	....	....	....	....	....	....	....	....	●	1857	Newark, N. J.
Davison Chemical Co.	●	●	....	....	●	....	....	....	....	....	....	....	●	1935	Baltimore, Md. (1)
Dennis Co., The Martin	....	....	●	....	....	....	....	....	....	....	....	....	●	....	Newark, N. J.
Diamond Alkali Corp.	....	....	●	....	....	●	....	....	....	....	....	....	●	....	Painesville, Ohio (6)
Dow Chemical Co.	●	....	●	....	....	●	●	●	....	....	●	●	●	1897	Midland and Mt. Pleasant, Mich. (2)
Cliffs-Dow Chem. Co.	....	....	....	....	....	....	....	....	....	....	....	●	●	1935	Marquette, Mich. (1)
Ethyl-Dow Chem. Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1933	Wilmington, N. C. (1)
Io-Dow Chem. Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	....	Long Beach, Calif. (1)
Midland Ammonia Co.	....	●	....	....	....	....	....	....	●	....	....	....	....	....	Midland, Mich. (1)
E. I. du Pont de Nemours & Co.	●	●	●	●	●	●	●	●	●	●	....	●	●	1915	Wilmington, Del.; Niagara Falls, N. Y.; Old Hickory, Tenn. (81)
Bayer-Semesan Co., Inc.	....	....	....	....	....	....	....	....	....	....	....	....	●	....	
Kinetic Chemicals, Inc.	....	....	....	....	....	....	....	....	....	....	....	....	●	1930	Deepwater Point, N. J. (1)
Old Hickory Chemical Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1928	Old Hickory, Tenn. (2)
Eastman Kodak Co.	....	....	....	....	....	....	....	●	....	....	....	●	●	1892	Rochester, N. Y.
Tennessee Eastman Co.	●	....	●	....	....	....	....	....	....	....	....	●	●	1920	Kingsport, Tenn (1)

Company and principal subsidiaries	Acids	Nitrogen and compounds	Sodium compounds	Potassium compounds	Alum and Al. compounds	Chlorine and bleaching compounds	Coal-tar products	Plastics and pyroxylin products	Compressed gases	Pigments, paints and varnishes	Pharmaceuticals	Solvents	Misc. chemicals	Year of Inc.	Location of principal plants and number of plants
Electro Bleaching Gas Co.	....	....	....	....	....	●	....	....	....	....	....	....	....	1907	Niagara Falls, N. Y (1)
Niagara Alkali Co.	●	....	●	●	....	....	....	....	....	....	....	....	●	1910	Niagara Falls, N. Y. (1)
Franco-American Chem. Wks.	....	....	....	....	....	....	....	....	....	....	●	●	●	1900	Philadelphia, Pa.; Carlstadt, N. J. (2)
Freeport Sulphur Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1913	Freeport, Tex.; Grande Ecaile, La.; (5)
Glidden Co., The	....	....	....	....	....	....	....	....	....	●	....	....	●	1917	Cleveland, Ohio (51)
Gt. Western Electrochem. Co.	●	●	●	●	....	●	....	....	....	....	....	●	●	1916	Pittsburg, Calif. (3)
Harshaw Chemical Co.	●	....	●	●	●	....	....	....	....	....	....	....	●	1892	Philadelphia, Pa.; Cleveland and Elyria, Ohio (3)
Hercules Powder Co.	●	●	....	....	●	....	....	●	....	....	....	●	●	1913	Parlin, N. J.; Brunswick, Ga. (47)
Heyden Chemical Co.	....	....	....	....	....	....	●	....	....	....	....	....	●	1925	Garfield and Fords, N. J. (2)
Hooker Electrochemical Co.	●	....	●	....	....	●	●	....	....	....	●	●	●	1903	Niagara Falls, N. Y.; Tacoma, Wash. (2)
International Agri. Corp.	●	....	●	....	....	....	....	....	....	....	....	....	●	1909	Montgomery, Ala.; Cincinnati, Ohio (27)
International Salt Co.	....	....	●	....	....	....	....	....	....	....	....	....	....	1901	Ludlowville, Ky.; Avery, La. (8)
Innis, Speiden Co.	●	●	●	●	●	●	....	....	....	....	....	....	●	1816	Niagara Falls, N. Y.; Jersey City, N. J. (4)
Koppers Co.	....	....	....	....	....	....	●	....	●	....	....	●	●	1927	Kearney, N. J.; St. Paul, Minn. (15)
Lilly Co., Eli	....	....	....	....	....	....	....	....	....	....	●	....	....	....	Indianapolis, Ind.
Liquid Carbonic Corp.	....	....	....	....	....	....	....	....	●	....	....	....	....	1926	Chicago, Ill. (36)
Mallinckrodt Chem. Works	●	....	●	●	....	....	....	....	....	....	●	....	●	....	St. Louis, Mo. (6)
Mathieson Alkali Works	....	●	●	....	....	●	....	....	....	....	....	....	●	1892	Niagara Falls, N. Y.; Saltville, Va.; Lake Charles, La. (3)
Merck & Co., Inc.	●	....	●	●	●	....	....	....	....	....	●	....	●	1891	Rahway, N. J.; Philadelphia, Pa. (2)
Metal & Thermit Co.	....	....	....	....	....	....	....	....	....	●	....	....	●	....	Pittsburgh; Pa.
Michigan Alkali Co.	....	....	●	....	....	....	....	....	....	....	....	....	....	....	Wyandotte, Mich. (2)
Monsanto Chemical Co.	●	....	●	....	....	....	●	....	....	●	●	●	●	1901	St. Louis, Mo.; Monsanto, Ill.; Everett, Mass. (9)
Mutual Chem. Co. of America	●	....	●	●	....	....	....	....	....	....	....	....	●	1853	Jersey City, N. J.; Baltimore, Md. (2)
Myles Salt Co.	....	....	●	....	....	....	....	....	....	....	....	....	....	1898	Weeks Island, La.
National Lead Co.	●	....	....	....	....	....	....	....	....	●	....	....	●	1891	Brooklyn, N. Y.; St. Louis, Mo.; Perth Amboy, N. J. (32)
National Cylinder Gas Co.	....	●	....	....	....	....	....	....	●	....	....	....	....	1933	Chicago, Ill.; Columbus, Ohio (20)
Neville Co., The	....	....	....	....	....	....	●	●	....	....	....	●	●	....	Pittsburgh, Pa.
Newport Industries, Inc.	....	....	....	....	....	....	....	....	....	....	....	●	●	1931	Pensacola, Fla.; Dequincy, La.; Bay Minette, Ala. (3)
New Jersey Zinc Co.	●	....	....	....	....	....	....	....	....	●	....	....	●	1880	Palmerton, N. J.
Niacet Chemical Corp.	●	....	....	....	....	....	....	....	....	....	....	....	●	1848	Niagara Falls, N. Y. (1)
Oldbury Electrochemical Co.	....	....	●	●	....	....	....	....	....	....	....	....	●	....	Niagara Falls, N. Y. (1)
Ozark Chemical Co.	●	....	....	....	....	....	....	....	....	....	....	....	●	....	Tulsa, Okla.
Pacific Coast Borax Co.	....	....	●	....	....	....	....	....	....	....	....	....	●	....	Wilmington, Calif. (1)
Parke, Davis & Co.	....	....	....	....	....	....	....	....	....	....	●	....	....	1875	Detroit, Mich.; Bridgeport and Versailles, Conn. (12)
Pennsylvania Salt Mfg. Co.	●	●	●	....	●	●	....	....	....	....	....	....	●	1850	Wyandotte, Mich.; Tacoma, Wash. (5)
Pfizer & Co., Chas.	●	....	●	●	....	....	....	....	....	....	....	●	●	1849	Brooklyn, N. Y. (1)
Philadelphia Quarts Co.	....	....	●	....	....	....	....	....	....	....	....	....	....	1831	Rahway, N. J.; Chester, Pa. (8)
Potash Co. of America	....	....	....	●	....	....	....	....	....	....	....	....	....	1931	Carlsbad, N. M. (1)
Procter & Gamble	●	....	....	....	....	....	....	....	●	....	....	....	●	1837	Port Ivory, N. Y.; Baltimore, Md. (8)
Quaker Oats Co.	●	....	....	....	....	....	....	....	....	....	....	●	●	1901	Chicago, Ill. (1)
Reilly Bar & Chemical Co.	●	....	....	....	....	....	●	....	....	●	....	●	●	....	Chicago, Ill.; Indianapolis, Ind. (14)
Rohm & Haas	....	....	●	●	....	....	....	●	....	....	....	....	●	....	Bristol, Bridesburgh, Pa. (2)
Resinous Products & Chem. Co.	....	....	....	....	....	....	....	●	....	....	....	....	●	....	....
Lennig & Co., Chas.	....	....	....	....	....	....	●	....	....	....	....	....	●	....	Philadelphia, Pa.
Sharples Solvents Co.	●	....	....	....	....	....	....	....	....	....	....	●	....	....	Wyandotte, Mich. (1)
Shell Chemical Co.	....	....	....	....	....	....	....	....	....	....	....	●	●	....	San Francisco, Calif.
Sherwin-Williams Co.	....	....	....	....	....	....	●	....	....	●	....	●	●	1884	Chicago, Ill.; Cleveland and Dayton, Ohio (13)
Southern Alkali Co.	....	....	●	....	....	....	....	....	....	....	....	....	●	1931	Corpus Christi, Tex. (1)
Squibb & Sons, E. R.	....	....	....	....	....	....	....	....	....	....	●	....	....	1858	Brooklyn, N. Y.; New Brunswick, N. J.
Standard Oil Co.	....	....	....	....	....	....	....	....	....	....	....	●	●	....	Baynay, Bayonne, N. J.
Std. Wholesale Phosphate & Acid Wks.	●	●	....	....	....	....	....	....	....	....	....	....	●	1911	Curtis Bay and Baltimore, Md. (2)
Stauffer Chemical Co.	●	....	●	....	●	●	....	....	....	....	....	....	●	1885	Baton Rouge, La.; Niagara Falls, N. Y.; Berkley, Calif. (17)
Sterling Products, Inc.	....	....	....	....	....	....	....	....	....	....	●	....	●	1932	Wheeling, W. Va.; Rensselaer, N. Y. (7)
Tennessee Corp.	....	....	....	....	....	....	....	....	....	....	....	....	●	1916	Copperhill, Tenn.; Atlanta, Ga.; Lockland, Ohio (7)
Texas Gulf Sulphur Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1909	Newgulf and Long Point, Tex. (3)
Union Carbide & Carbon Corp.	....	....	....	....	....	....	....	....	....	....	....	....	....	1917	(160)
Carbide & Carbon Chem. Corp.	....	....	....	....	....	....	●	....	●	....	....	●	●	1920	So. Charleston, W. Va. (1)
Linde Air Products Co.	....	....	....	....	....	....	....	....	●	....	....	....	●	1907	Chicago, Ill.; Newark, N. J. (60)
Prest-O-Lite Co.	....	....	....	....	....	....	....	....	●	....	....	....	....	1913	Los Angeles, Calif.; Newark, N. J. (49)
Union Carbide Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	1898	Niagara Falls, N. Y.; Sault Ste. Marie, Mich.(2)
United Chemicals, Inc.	....	....	....	....	....	....	....	....	....	....	....	....	●	1929	
Curtis-Howe Corp.	....	....	....	....	....	....	....	....	....	....	....	....	●	1927	
Barium Products, Ltd.	....	....	●	....	....	....	....	....	....	....	....	....	●	....	Modesto, Calif.
Peroxide Mfg. & Specialties Co.	....	....	●	....	....	....	....	....	....	....	....	....	●	....	San Francisco, Calif.
U. S. Industrial Alcohol Co.	....	....	....	....	....	....	....	....	....	....	....	●	....	1906	Baltimore, Md.; Newark, N. J. (7)
U. S. Industrial Chem. Co., Inc.	....	....	....	....	....	....	....	....	....	....	....	●	●	1917	So. Baltimore, Md. (1)
Wood Products Co.	....	....	....	....	....	....	....	....	....	....	....	●	●	....	Buffalo, N. Y. (1)
U. S. Potash Co.	....	....	....	●	....	....	....	....	....	....	....	....	....	1926	Carlsbad, N. M. (1)
Vanadium Corp. of America	....	....	....	....	....	....	....	....	....	....	....	....	●	1906	Bridgeville, Pa.; Niagara Falls and Lewiston, N. Y. (7)
Victor Chemical Works	●	....	●	....	●	....	....	....	....	....	....	....	●	1902	Chicago Hts., Ill.; Nashville, Tenn. (2)
Virginia Smelting Co.	....	....	....	....	....	....	....	....	....	....	....	....	●	....	West Norfolk, Va.
Westvaco Chlorine Products Corp.	●	....	●	....	●	●	....	....	....	....	....	●	●	1926	So. Charleston, W. Va.; Carteret, N. J.; Newark, Calif.
Wishnick-Tumpeer, Inc.	....	....	....	....	....	....	....	....	....	●	....	....	●	....	Lawrenceville, Ill.; Borger, Tex. (2)
Zimmer & Co.	●	....	....	....	....	....	●	....	....	....	....	....	●	1897	Hastings-on-Hudson, N. Y. (1)

Chemical Engineer's BOOKSHELF

For the Chemistry Reference Shelf

NEGATIVE CATALYSIS

THE RETARDATION OF CHEMICAL REACTIONS. *By Kenneth C. Bailey.* Published by Longmans, Green & Co., New York City. 479 pages. Price, $8.

Reviewed by *Hugh S. Taylor*

IN A recent review of the contributions of chemical industry to man, ("Man in a Chemical World," Scribner's 1937) A. Cressy Morrison points out that the reduction in cost of tire mileage since 1920 represents a saving to the motoring public in the United States of 28 billions of dollars during the period 1920-1934. The big fall in the cost of tire mileage has occurred during the past ten years. Much of this is attributable to increased mileage per tire due to the incorporation of ingredients which retard deterioration. This constitutes one illustration of the importance of the general subject discussed in the present volume. Stabilization of vitamins, prevention of rancidity in fats and foods, of gum formation in gasoline, of knocking in internal combustion engines, these are other examples of the application of the principle of retardation.

On the academic side the subject has led to a tremendous development in the theory of reaction mechanism. Chain reactions, suggested by Bodenstein in 1913, are now discussed even in elementary physical chemistry texts. Older theories of retardation by destruction of positive catalysts have in some cases persisted. Retardation of an undesirable type in catalytic reactions at surfaces has been examined and associated with adsorption at or reaction with catalyst surfaces.

Dr. Bailey has compiled an authoritative and comprehensive treatment of the phenomenon in all its many forms. The reviewer must be one of many who have long desired such a volume; it is so excellent that it will remain at all times within easy reach of the writer's desk. The book, as its author intended, successfully caters to the non-specialist chemist and to those desiring the detailed information. There is a bibliography with 1630 titles, an additional author index for papers dealing with other than retardation phenomena and a subject index listing retardants and reactions retarded. The format and printing are excellent. The price is high. Were it lower, one could without hesitation recommend even to our impecunious graduate students that they own their own copies. As it is, our libraries will have in this volume a well-used text which the many industrial organizations cannot afford to withhold from their chemists. It will enrich their comprehension of a subject rapidly growing in significance in all phases of chemical progress.

QUANTITATIVE METHODS

METHODS OF QUANTITATIVE ANALYSIS. By *M. G. Mellon.* Published by the Macmillan Co., New York City. 456 pages. Price, $3.

Reviewed by *M. E. Clark*

UPON reading the first hundred pages of this new treatise, the reader may become somewhat discouraged by the mass of elementary detail. However, if he persists in reading the balance of the volume, he will be delighted with the author's novel and comprehensive treatment of quantitative analytical methods.

In contrast with the time honored division of the methods of analysis into volumetric and gravimetric classification, Dr. Mellon has divided them into *specific property* methods and *systematic property* methods. Under specific property methods he includes titrimetric, gravimetric, volumetric, manometric, and thermometric methods; and under the systematic classification are density, optico-chemical, electrometric, and various other physico-chemical methods. In other words he has broadened the scope of the usual elementary quantitative text to include many analyses usually performed by students of physical chemistry.

Throughout the book the emphasis is laid on theory rather than technique of procedure. The style used is one which is easily understood and convincing. Dr. Mellon has anticipated many difficulties that the student analysts will encounter and has forestalled their questions. He has paralleled the various procedures by dividing each of them into four main parts: theory, apparatus, the sample, and the desired constituent.

Then, briefly, though the scope of the book is extremely wide and in spite of the long elementary introduction, the clear, simple language used and the thoroughness with which each analysis is described serve to make the work a good textbook for the college student. And the fact that it does cover analytical chemistry all the way from a description of the laboratory notebook to the latest chronological methods for the quantitative determination of radioactive substances makes it an even better reference book for the chemist or chemical engineer.

NEW WORDS AND OLD

HACKH'S CHEMICAL DICTIONARY. Second Edition. By *I. W. D. Hackh and Julius Grant.* Published by P. Blakiston's Son & Co., Inc., Philadelphia, Pa., 1,020 pages. Price, $12.

"THE DEVIL should write books on chemistry, for every few years the science changes," were the words of Berzelius a hundred years ago. That they are even more true today is borne out by the large number of new chemical terms which have come into recognized usage since the first volume of Mr. Hackh's dictionary appeared in 1929. Over 200 additional pages are contained in this new edition, part of which represent entirely new material and part a modernization of older definitions and descriptions. To make a long and commendatory review short, the revision is eminently justified.

GENERAL REFERENCES REVISED

SMITH'S INORGANIC CHEMISTRY, 2nd revised edition. By *James Kendall.* Published by D. Appleton-Century Co., Inc., New York City. 921 pages. Price, $4.

Reviewed by *W. L. Abramowitz*

THOSE of us who were nurtured on the earlier edition of Smith-Kendall

will always retain a warm spot for it in our hearts. An impartial review from such biased judges is hardly to be expected. The book in this reviewer's mind is more than ever one of the most lucid and comprehensible of student texts. Kendall writes even as he lectures. The factual data on inorganic chemistry has not been altered particularly since the last revision, but splendid progress has been made in reducing the recent theoretical advances to simple yet inclusive statements. The chapters on chemical equilibrium, ionization and atomic structure have been extensively renovated.

Because of the necessarily fairly elementary presentation of the subject matter, the value of the book as a reference source to the chemical engineer or chemist is limited.

GENERAL CHEMISTRY FOR COLLEGES. Revised Edition. By *B. Smith Hopkins*. 758 pages. Price, $3.72.

LABORATORY EXERCISES AND PROBLEMS IN GENERAL CHEMISTRY. Third Edition. By *B. S. Hopkins* and *M. J. Copley*. 234 pages. Price, $1.76.

LABORATORY MANUAL OF INORGANIC CHEMISTRY AND ELEMENTARY QUALITATIVE ANALYSIS. Revised Edition. By *C. C. Hedges* and *H. R. Brayton*. 271 pages. Price, $1.48. All published by D. C. Heath and Co., New York City.

THE fundamental plan of the first edition of Hopkins' "General Chemistry" is retained in this revision. Aside from a general modernization of the text, the major change is in the location of the material on atomic structure and periodic arrangement of the elements. To conform with modern teaching methods, this has been moved forward in the book to follow immediately after the discussion of the fundamental conceptions of matter, energy and change contained in the first chapter. Continuing as an outstanding feature of this book is its encouragement of early familiarity with the chemical literature through numerous references to books and recent periodical articles not too technical for the beginner.

Of the two laboratory manuals, the one by Hopkins and Copley seems to offer a more comprehensive outline for exercise in general chemistry. The sequence of material follows that in the new edition of the Hopkins textbook. The Hedges and Brayton manual in addition to 115 exercises in inorganic chemistry contains 180 pages on determinations in elementary qualitative analysis.

MANUFACTURE OF WHISKEY, BRANDY AND CORDIALS. Second Edition. By *Irving Hirsh*. Published by Sherman Engineering Co., Newark, N. J. 183 pages. Price, $10.

FIFTY pages of new and revised material have been added to produce the second edition of this book on the processing of high grade malted, fermented and distilled beverages. Contained in the added matter are some new mashing formulas, material on the improved rapid aging of liquors, and several new flowsheets and physical tables. Treatment of the material in this book is entirely from the practical standpoint of production and operation.

PROCEEDINGS OF THE NATIONAL FERTILIZER ASSOCIATION, 1936–37. Published by the Association, Washington, D. C. 114 pages.

THE proceedings of the thirteenth annual convention of the Association held at White Sulphur Springs, W. Va., June, 1937, are recorded in this volume.

GOVERNMENT PUBLICATIONS

Documents are available at prices indicated from superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.

Specifications for Welding and Reference Data for Use Therewith. Navy Department, Bureau of Construction and Repair, General Specifications, Appendix 5, March, 1937 Edition; 15 cents.

Thermal Springs in the United States. Geological Survey Water-Supply Paper 679-B; 35 cents.

California Redwood and Its Uses. Bureau of Foreign and Domestic Commerce, Trade Promotion Series 171; 10 cents. Includes information on physical characteristics and industrial uses.

Census Data. Pamphlets which will constitute chapters of a volume summarizing the 1935 Census of Manufacturers are being published currently to replace preliminary mimeographed statements that were issued about a year ago. Individual pamphlets at 5 or 10 cenas each can be had from the Superintendent of Documents. Correspondence regarding classification of industries must be with the Bureau of the Census.

Production, Fortification, Tax Payment, Etc., of Wine. Bureau of Internal Revenue, Regulations No. 7, printed in the Federal Register, October 12, 1937. Wine regulations, including test methods and alcohol data.

The Durability of Building Papers and Fiberboards Relative to Low-Cost Housing. Bureau of Standards Letter Circular 502B; mimeographed.

Floor Coverings. Bureau of Standards, mimeographed documents on: Investigation of low-cost floor coverings, LC502F; Resistance of floor covering materials to staining and chemicals, TIBM-52; Adhesives for floor coverings, TIBM-53; Relative resistance of floor covering materials to abrasion, TIBM-54.

Convention Dates of Trade Associations. Chamber of Commerce of the United States, October 1, 1937; mimeographed. Dates and places of meeting of conventions to be held by trade associations.

Foreign Investments in the United States. Bureau of Foreign and Domestic Commerce, unnumbered document; 15 cents.

The Balance of Trade of the Pacific Northwest, Preliminary Edition, Pacific Northwest Regional Planning Commission, Portland, Oregon; mimeographed.

Statistics of Capital Movements Between the United States and Foreign Countries and of Purchases and Sales of Foreign Exchange in the United States, Second Quarter, 1937. Treasury Department, Division of Research and Statistics, Report No. 4; 15 cents.

Geology and Ground-Water Resources of Ogden Valley, Utah, by R. M. Leggette and G. H. Taylor. U. S. Geological Survey Water-Supply Paper 796-D; 10 cents.

The Yukon-Tanana Region Alaska, by J. B. Mertie, Jr. U. S. Geological Survey Bulletin 872; 70 cents.

Sampling and Testing of Gold-Scheelite Placer Deposit in the Mojave Desert, Kern and San Bernardino Counties, Calif., by H. W. C. Prommel. Bureau of Mines, Information Circular 6960; mimeographed.

The Copper Deposits of Michigan, by B. S. Butler and others. Geological Survey Professional Paper 144; $2.50.

Geology and Ore Deposits of the Leadville Mining District, Colorado, by S. F. Emmons and others. Geological Survey, Professional Paper 148; $2.50.

National Resources. Hearings before the Committee on Rivers and Harbors, House, 75th Congress, 1st Session, on H.R. 7365 and H.R. 7863, bills to provide for the regional conservation and development of the national resources; 45 cents.

Regional Planning; Part 5, Red River of the North. National Resources Committee; 25 cents.

Our Cities—Their Role in the National Economy. Report of the Urbanism Committee to the National Resources Committee.

Carbon Bisulphide Poisoning (Carbon Disulphide), its Cause and Prevention. Division of Labor Standards, Industrial Health and Safety Series 12; 5 cents.

Carbon Dioxide Asphyxiation, its Cause and Prevention. Division of Labor Standards, Industrial Health and Safety Series 13; 5 cents.

Occupational and Environmental Analysis of the Cement, Clay, and Pottery Industries. Public Health Bulletin 238; 10 cents.

Review of Carbon Monoxide Poisoning. Public Health Bulletin 195, 1936 Revision; 15 cents.

Water Borne Passenger Traffic of the United States, Fiscal Year Ended June 31, 1936. U. S. Maritime Commission, Division of Research, Report No. 157 Annual; Multilithed.

Paints, Varnishes, and Related Products (Shades and Containers). Bureau of Standards, Simplified Practice Recommendation 144-37; 5 cents.

Digest of State and Federal Labor Legislation Enacted September 15, 1936 to July 1, 1937. Division of Labor Standards, Bulletin No. 15; 15 cents.

Some Results of First-Aid Training of all the Employees of a Mine or Plant, by J. J. Forbes. Bureau of Mines, Information Circular 6957; mimeographed.

Bibliography of United States Bureau of Mines Investigations on Coal and its Products, 1910-35, by A. C. Fieldner and others. Bureau of Mines, Technical Paper 576; 15 cents.

Chemistry of the Anhydrous Chlorides of Chromium, a Thermodynamic Investigation, by H. A. Doerner. Bureau of Mines, Technical Paper 577; 10 cents.

Burning of Coal and Coke Treated with Small Quantities of Chemicals. Bureau of Mines, Bulletin 404; 15 cents.

Mining and Reduction Methods and Costs at the Oceanic Quicksilver Mine, Cambria, San Louis Obispo County, Calif., by A. W. Frolli. Bureau of Mines Information Circular 6950; mimeographed.

Aerial Tramways in the Metal-Mining Industry, by O. H. Metzger. Bureau of Mines, Information Circular 6948; mimeographed.

A Method of Determining Porosity; A List of Porosities of Oil Sands, by D. B. Taliaferro, Jr., and others. Bureau of Mines, Report of Investigations 3352; mimeographed.

Chemical Engineering NEWS

SOCIAL ACTIVITIES SCHEDULED FOR CHEMICAL EXPOSITION WEEK

Principal sections of the Sixteenth Exposition of Chemical Industries which will open at Grand Central Palace, New York, on Dec. 6, will include chemical products and raw materials; general plant equipment; processing machinery; pumps, piping, hydraulics accessories; materials handling equipment; containers and packaging; laboratory equipment and supplies; instruments of precision; metals and alloys; brewing, distilling and bottling; synthetic plastics.

The exhibits will include displays of precious metals, gold, silver, and platinum, showing their newest applications for both laboratory and plant. Exhibitors of platinum laboratory ware will call attention to improved precious metal catalysts for large scale industrial processes. Rhodium platinum alloys which are used in certain of the most difficult industrial processes will also be on display.

Tantalum will be the subject of an educational exhibit depicting the mining, ores, intermediates, metallurgy, and fabricated products of that metal. Emphasis will be given to severe service corrosion problems. Of interest in this connection is the recent discovery of tanalum in the Black Hills of South Dakota. Until this year the world's tantalum supply had been mined in Australia.

Announcement is made that Norman E. Diehl, assistant division purchasing agent, E. I. du Pont de Nemours & Co., Wilmington, is the winner of the slogan contest sponsored by the Exposition.

On Wednesday evening, Dec. 8, Alpha Chi Sigma Fraternity will hold a dinner at the Shelton Hotel. The dinner is scheduled for 6:30 with a cocktail and social hour from 6 to 6:30. Prof. Walter H. Eddy of Columbia, successor to the late Dr. Harvey W. Wiley as food consultant for *Good Housekeeping*, will be the speaker.

The Junior Chemical Engineers of New York are planning to act as host at a banquet for visiting members of A.I.Ch.E. Student chapters.

The Technology Club of New York will hold a banquet at the Hotel Astor on Thursday evening, Dec. 9. Speakers will be Karl T. Compton, president of M.I.T., Gerard Swope, president of the General Electric Co., and W. K. Lewis, professor of chemical engineering at M.I.T. There will also be a moving picture presentation on "The Story of Heat." Reservations should be made at the Technology Club, 22 East 38th St.

Chemical Engineers Meet In St. Louis

As this issue goes to press the thirtieth annual meeting of the American Institute of Chemical Engineers is in progress at St. Louis. A full program of technical sessions and plant inspection trips promises to attract a large proportion of the Institute's membership. Considerable interest centers in the industrial papers describing the Monsanto development of strong phosphoric acids and other new phosphorus derivatives, as described by reresentatives of the Thomas and Hochwalt Laboratories of Dayton, Ohio. A. M. Fairlie, discusses recent developments in the chamber process for sulphuric acid. J. B. Pierce, Jr. describes the natural sodium sulphate industry of Saskatchewan. F. C. Mitchell and H. C. Vernon of the du Pont Company discuss the safe handling of flammable liquids. These papers will be published in *Chem. & Met.* next month. A symposium on crushing and grinding accounts for four other papers and another important group deals with the theoretical principles of chemical engineering.

Plant visits are scheduled to the works of Monsanto, Anheuser-Busch, Inc., Shell Petroleum, and other industries of the St. Louis area.

Prior to the general meeting a two-day student meeting was held under the chairmanship of Prof. L. E. Stout of Washington University.

One of the features was a round-table discussion of professional work and the development of the young chemical engineer.

Francis P. Garvan Dies After Brief Illness

Francis P. Garvan, president of the Chemical Foundation, died at his home 740 Park Ave., New York, on Nov. 10

Francis P. Garvan

after a brief illness. In the World War years, Mr. Garvan became chief of the U. S. Bureau of Investigations at New York and later went to Washington as Alien Property Custodian. He seized dye and chemical patents of German interests and turned them over to the Chemical Foundation so they might become available to the domestic industry. He was the founder of National Farm Chemurgic Council and was the only layman to receive the Priestly Medal of the American Chemical Society. In 1929 he and Mrs. Garvan were awarded jointly the medal of the American Institute of Chemists.

The general committee in charge of the St. Louis convention consisted of Past President Dr. F. W. Frerichs, Honorary Chairman; Dr. Jules Bebie, Chairman; Mr. H. E. Wiedemann, Vice-Chairman; Mr. Gaston DuBois, Treasurer; and Mr. Sam Cottrell, Secretary. In addition the following are chairmen of sub-committees: Clarence Barbre, Local Public Relations; R. S. Sherwin, Transportation; Prof. L. E. Stout, Plant Visits; F. W. Frerichs, Jr., Entertainment; K. R. Fox, Registration and Hotels; and Miss Hildegarde Frerichs, Ladies' Program.

NEWS FROM WASHINGTON

Washington News Bureau
McGraw-Hill Publishing Co.
Paul Wooton, Chief

LEGISLATIVE plans of the New Deal and business problems have become greatly ensnarled in Washington. The President and his close advisers will probably be somewhat more conservative than before the down trend in commodities, securities, and business activity became unmistakably evident. But even so, the proposals for the coming session will not differ greatly from those which were contemplated many months ago. However, conservatives hope that the very real uncertainties of business men may be noted sufficiently by the members of Congress to temper legislative enthusiasm during the coming winter.

The President's fireside chat calling Congress into session November 15 presented the agenda of major topics for study. Wage-hour standards, crop control, regional planning, government reorganization, and more vigorous anti-trust regulation were the five objectives cited. Omission of a new tax law from the list did not deceive anyone as to the importance and imminence of that effort. Most controversial of the subjects of interest to business are the questions of capital-gains taxes and the possibility of lightening somewhat taxes on undistributed profits. Generally, however, more taxes, rather than less, will have to be levied.

Chemical industry may be more directly concerned with such matters as stream-pollution control, extension of neutrality rules, food and drug legislation, and some of the special Congressional inquiries. But it is not likely that any of these distinctive measures will bear as heavily on the stockholder's pocketbook as the general laws which affect all business.

International Affairs

Trade agreement progress on the British pact has been significant, but unofficial, during recent weeks. Official announcement has been made that a reciprocal pact is to be discussed with Venezuela and Turkey. The Czechoslovakian agreement has advanced. Discussion of it has raised the interesting question as to whether some of the chemical-industry concessions being considered by Secretary Hull may not be really for the benefit of other nations, with the Czechs merely as window dressing. This is, however, a less important question than it would be if any concessions granted by Uncle Sam were not automatically extended to all the world.

Leadership in peacemaking by Uncle Sam's delegates to Brussells give new importance to Japanese commodity problems. These problems are likely to stir bitter argument in Congress, some members of which feel that the President has unwarrantably disregarded the Neutrality Act in the present Far Eastern incident.

Broad policies affecting trade and chemical commodities will probably be much more significant in determining chances for future Oriental trade than any specific controls such as the Japanese embargo on the limited list of goods announced some weeks ago. Regardless of official rulings of Japan, further opportunity for trade with that country seems almost certain to be limited to goods of military necessity, because of the need for conserving funds for the war budget.

Potash Inquiry

A special Senate committee, authorized more than a year ago to investigate the ownership and controls affecting the American potash industry, unexpectedly resumed its study in the Far West during October. The latest "scandal" charged is the marketing of American potash to Japan, a charge based on the thought that we are thus aiding the military of that nation in their attack on China. It is not clear what important technical or economic factors are to be studied, if any. Industry representatives are cooperating with the Senate investigators, in order to make a full record of the service and achievements of those who have developed American potash resources from nothing to their present impressive size within so short a period of time.

Another mineral inquiry of chemical significance gives promise of renewed activity this winter. Advocates of an American tin industry are proposing to resume their battle for such subsidy as would lead to the establishment of tin smelters and the exploitation of tin deposits in the United States. Critics of this plan argue, as heretofore, that an expenditure of half as much money on research regarding tin uses and tin substitutes would serve the people better than a large sum spent on tin subsidy.

Then comes the Federal Trade Commission, in its annual report to Congress, again reciting its need for greater authority, so that it might prosecute unfair or deceptive practices without demonstrating that they affect competition, and its desire for authority to initiate investigations in certain new fields now closed to it. As a matter of fact, the Commission follows the President's lead in the desire to curb business merely because of its bigness.

Current activities of the Federal Trade Commission have included recently rescinding of the old petroleum products trade practice rules, the formal establishment of trade practice regulations for the rayon industry (accurately defining terms which may be used by that industry), and announcement of hearings in the case charging illegal basing-point pricing by the cement industry.

One extreme to which F.T.C. will go in its trade prosecution under the Robinson-Patman law is noted in the briefs of the Standard Brands case. Counsel there take the position that "there may be an injury to competition due to discriminatory prices, even though the effect of such prices may not be to substantially lessen it, or tend toward a monopoly or destroy or prevent competition. . . Where the effect of discriminatory prices may be to give the person receiving such prices an advantage over his competitors in the competitive struggle, this justifies the Commission in holding that there may be an injury to competition."

Business Trends

Washington would like to know the meaning of the present business symptoms. They are quite as concerned under the surface as are the security owners, but officially admit nothing. Informally there is a general conceding of the fact that business has more than stopped gaining; it is actually slipping back a little.

Officials believe that they have some business headache tablets left in their hands. But the Chief Executive gives no evidence of the willingness to relieve business jitters by relaxing legislative demands. Pressure for lower prices has been eliminated from the Washington program, as it has become evident that cost of living is now declining, prospectively at the expense of miners, farmers, and other producers of raw materials. Further goods price decline would be most unwelcome officially, just now.

The actual, though probably not the intended, effect of several Washington activities continues to trend toward higher manufacturing costs for process industry. Whatever wage-hour standards are fixed, whatever new taxes are levied, whatever benefits may be granted to agriculture, the result will be higher factory costs.

German Chemical Engineers Make Second American Tour

Forty German chemical engineers, under the leadership of Dr. Herbert Bretschneider, spent the first two weeks of November in a 3,000-mile tour of chemical centers in Eastern United States. This was the second of these visits arranged in recent years by Dechema, which is the German Association of Chemical Engineers and Chemical Equipment Manufacturers.

Following a reception and luncheon on November 2 in the McGraw-Hill Building, where the group was welcomed by leading American chemical engineers, the party left for Boston to visit the Merrimac works of Monsanto Chemical Co., the research laboratories of Arthur D. Little, Inc. and Gustavus J. Esselen, Inc., the chemical engineering departments at Massachusetts Institute of Technology and Harvard University. After stopping at Niagara Falls, Detroit and Chicago, the group returned to Pittsburgh on November 8 to inspect the new Mellon Institute of Industrial Research and the laboratories of the Aluminum Company of America and the Gulf Refining Company.

A complimentary dinner was held at the Mayflower Hotel in Washington, November 9 by representatives of various chemical interests there. The following day was spent in visits to the dye works of the du Pont company at Deepwater, N. J. and the experimental station of Hercules Powder Company. A stop was made in Philadelphia, November 11, to inspect the sugar refinery and alcohol plant of the Pennsylvania Sugar Company. In New York, prior to sailing on November 13, the party inspected the Hunts Point gas works of the Consolidated Edison Company and the refinery of the Standard Oil Company of New Jersey at Bayway.

The membership of the group included 26 representatives of I. G. Farbenindustrie as follows: Dr. Otto Balz and Dr. Gustav Wietzel of Oppau, Dr. Otto Bayer, Dipl. Ing. Franz Dahm, Dipl. Ing. Theodore Mueller and Dr. Ottmar Wahl of Leverkusen, Dr. Ing. Bueche of Koeln, Dr. Gustav von Bruening and Dir. Dr. Wilhelm Pfaffenburg of Hoechst, Dr. Eduard Doerr of Elberfeld, Dr. Walther Duerrfeld and Dir. Dr. H. Ad. von Staden of Leuna-Werke, Dr. Ernst Engelbertz of Griesheim, Dr. Paul Esselmann of Wolfen-Film-Fabrik, Dr. Ulrich Haberland of Uerdingen, Dr. Walter Hagge of Wolfen-Farben-Fabrik, Dir. Dr. Herman Lang, Dr. Wilhelm Mueller and Dr. Rudolf Schulze of Bitterfeld, and Dr. Wilhelm Pfannmueller, Obering Jos. Reichart, Dr. Walter Reppe, Dr. Fritz Teller, of Ludwigshafen.

Representatives of other German companies included Dr. Aeckerle of Chemische Fabrik, Joh. A. Benckiser of Ludwigshafen, Prof. Dr. Erich Beschke of Thurm and Beschke of Magdeburg, Mr. Herman Keidel, of Weise & Monski & Weise of Halle, Dr. Karl Loeffl whose laboratory is in Berlin, Dr. Marcel Melliand of Mattiek G.m.b.H. of Heidelberg, Dir. Dr. Werner Siebert of Bamag-Meguin, Berlin, Mr. Temmler of Temmler Chemische Werke of Johannisthal and Mr. Wilhelm Voight of Mattiek G.m.b.H. of Pulznitz.

Harshaw Chemical Reduces Volume of Stock Issue

Harshaw Chemical Co., Cleveland, has filed an amendment with SEC reducing the number of shares of common stock to be offered to stockholders. The issue will consist of 27,083 shares instead of 59,458 shares originally scheduled to be offered. Rights are to be issued stockholders entitling them to subscribe for additional common stock on the basis of one-fifth share common for each right.

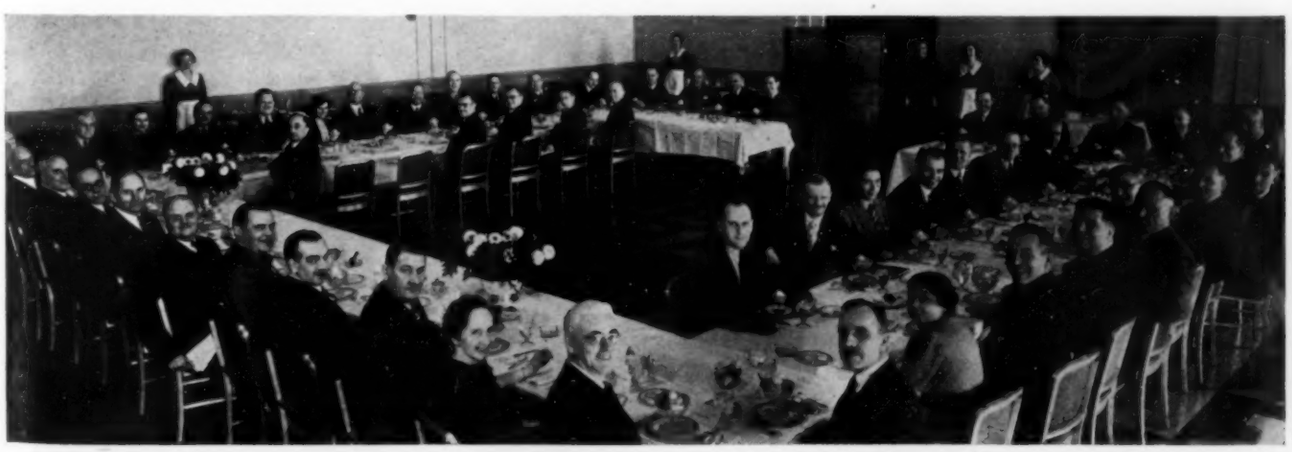
Delaware Gets New Chemical Engineering Laboratory

The University of Delaware dedicated its new $500,000 chemistry building on October 16 with a formal ceremony attended by representatives of 134 colleges, universities and learned societies. The new building is of attractive colonial style architecture and represents the most up-to-date laboratory construction and equipage. In addition to the usual facilities for work in chemistry, a large space has been reserved for chemical engineering equipment which will multiply several times the University's former facilities for carrying out heat and material balance work and laboratory study of the unit operations.

As a part of the dedication exercises, and in conjunction with the conference on chemistry and chemical engineering held at the University on October 15 and 16, honorary degrees of doctor of science were conferred on Warren K. Lewis, professor of chemical engineering, Massachusetts Institute of Technology; Frank C. Whitmore, dean of the school of chemistry and physics, Pennsylvania State College; and The Svedberg, Nobel prize winner in chemistry and director of the Institute of Physical Chemistry, Upsala University, Sweden.

Germany Restricts Use of Phenol Plastics

A report from Frankfort-on-Main to the Department of Commerce states that the official trade control board for chemicals by ordinance effective Sept. 3 has placed further restrictions upon the processing of phenol plastic materials in that manufacturers of household articles made of phenol and cresol plastic material may not increase their production of these articles beyond the levels or range of types prevailing at the time of the ordinance's release.



American chemical engineers welcome a delegation of German colleagues in New York luncheon, Nov. 2. Speakers were Martin H. Ittner, Albert E. Marshall, Herbert Bretschneider, F. A. Kertess, and Frank Mueller. S. D. Kirkpatrick was toastmaster

CHARLES FREDERICK CHANDLER

A GREAT AMERICAN CHEMIST

THE CELEBRATION of the centennial of the birth of Prof. Charles Frederick Chandler has been in progress for several weeks by Columbia University, his former students, and a great army of admirers all over the world. Columbia, with which he was associated during the greater part of his life, arranged an elaborate program of lectures, including the presentation of the Chandler Medal, and culminating in the Chandler Centennial Dinner at the Waldorf-Astoria on November 4. This tribute was paid to Professor Chandler in recognition of his invaluable contributions to the American chemical industry during a long, productive life.

Although Professor Chandler passed away more than twelve years ago, his greatness as a teacher of chemistry and as a personality has not been dimmed by the passing of time. In fact, his record of achievement increases in value and importance as the years go by. Many of the leading chemists and engineers of today were among the 30,000 students who received their inspiration and encouragement from this great teacher. Many young students would have quit chemistry in despair had it not been for the kindly aid and encouragement received from this great character.

Much of Professor Chandler's success as a teacher was due to an ability to present facts clearly and interestingly, and to illustrate his point with amusing and pertinent stories. His wit, his tact, and his spontaneity added much to the attractiveness of his class room. Is it any wonder the class stamped its approval when this genial gentleman entered the room?

The welfare of each student was uppermost in the mind of Professor Chandler. The door to his office was always open, for he was not only willing but anxious to discuss the problems of the students with them, whether they concerned the curriculum or financial matters. And those boys in financial difficulties were sure of assistance from this generous and kindly man.

Professor Chandler's influence extended far beyond the walls of the class room. He was a founder of the American Chemical Society and the Chemists' Club. His advice was much sought after by chemical manufacturers. The President of the United States appointed him to represent this country on several missions. At the invitations of the Governor of the State and the Mayor of New York he served on many civic organizations.

The honors that were bestowed upon him were numerous, but one that must have given him greatest pleasure was the tribute spoken by a former student during a dinner in his honor at the time of his retirement, "Our country is indeed fortunate that such a man should be spared to teach her youth for more than half a century, and yet, as has already been said of our guest, it is not alone, or chiefly, the knowledge he has imparted to others, so much as the force of his own noble example and what that has inspired others to do—not what he has taught, so much as what he is, that has made his influence felt far and wide throughout our land, and 'he who influences his own time, influences all time,' and is one who is really leaving an impress upon Eternity."

PERSONALITIES

✦ CHARLES G. BIRDSALL, formerly head of the laboratory of the Bright Star Battery Co., Clifton, N. J., is now chief chemist with General Dry Batteries, Inc., Cleveland, Ohio.

✦ E. S. BOSTON, chemical engineer, has been appointed district sales manager of the Patterson Foundry & Machine Co. of East Liverpool, Ohio.

✦ L. B. BROUGHTON has been made dean of the College of Literature and Science at the University of Maryland. He will also continue as head of the department of chemistry.

✦ NORMAN E. DIEHL, E. I. du Pont de Nemours & Co., was the winner of the $250 first prize in the Exposition of Chemical Industries slogan contest. The winning slogan: "Chemical Research Creates Industries."

✦ J. D. HITCH, who has been Tokyo resident engineer for the Dorr Co. for the past eight years, has returned to New York to take over the duties of the Company's export division.

✦ K. H. KIEFER has left the Publicker Commercial Alcohol Co. to head the research and development department of Joseph E. Seagram & Sons, Inc., of Louisville, Ky.

✦ ALEXANDER W. LIMONT, JR., formerly of E. I. du Pont de Nemours & Co., is the new manager of the compressor division of Sullivan Machinery Co. at Michigan City, Ind.

✦ DAVID M. HARVEY has been appointed superintendent of the oil department at the Philadelphia plant of E. F. Houghton & Co.

✦ SIDNEY B. HASKELL, former president of the Synthetic Nitrogen Products Corp., has recently joined the Barrett Co. as vice-president.

✦ WILBERT J. HUFF, who has been directing the work in gas engineering at Johns Hopkins University, is now professor of chemical engineering at the University of Maryland.

✦ RUSSELL S. MCBRIDE, who serves as editorial representative of *Chem. & Met.* in Washington, has removed his offices from the Colorado Building to 712 Jackson Place, and from that new location will continue the same service to *Chem. & Met.* and its readers as formerly.

✦ H. L. MINER, E. I. du Pont de Nemours & Co., Wilmington, Del., has been chosen chairman of the chemical section of the National Safety Council at its recent meeting held in Kansas City, Mo.

✦ WILLIAM M. RAND, president of the Merrimac Chemical Co., Everett, Mass., has been elected president of the Associated Industries of Massachusetts.

✦ ROBERT E. VIVIAN has been appointed head of the newly created department of chemical engineering at the University of Southern California. Dr. Vivian was formerly associated with the Metals Disintegrating Co., Elizabeth, N. J.

Men of Achievement

✦ E. J. CRANE, editor of *Chemical Abstracts,* has received the Chemical Industry Medal in recognition of his work on the standardization of nomenclature and the spelling and pronunciation of chemical terms. Mr. Crane is the author of a number of publications in the field of chemical literature.

✦ JAMES G. MARSHALL, general superintendent of the Niagara Falls plant of the Union Carbide and Electro Metallurgical Companies, received the annual Jacob F. Schoellkopf Medal at a recent meeting of the Western New York section of the American Chemical Society.

E. J. Crane

F. J. Tone

✦ PAUL D. MERICA, director of research for the International Nickel Co., has been awarded the 1938 John Fritz Gold Medal for "important contributions to the development of industrial alloys."

✦ H. SIDNEY SMITH, consulting engineer for the Union Carbide & Carbon Corp., has been awarded the American Welding Society's Samuel Wylie Miller Medal for "meritorious contributions to the science and art of welding."

✦ FRANK J. TONE, president of the Carborundum Co., Niagara Falls, N. Y., is the recipient of the 1938 Perkin Medal of the American section of the Society of chemical Industry.

Chemical ECONOMICS and MARKETS

CHEMICAL INDUSTRY AFFECTED BY DROP IN GENERAL BUSINESS

VOLUME of industrial production as measured by the Federal Reserve Board's seasonally adjusted index declined from 117 in August to 111 in September.

Declines in industrial production in September and the first part of October reduced output to the level of a year ago and commodity prices continued to decline, the board said in its monthly statement. The volume of distribution to consumers was maintained at the level of previous months.

Prices of commodities, according to the index of the Bureau of Labor Statistics, quoted by the board, declined from 87.5 per cent of the 1926 average in the latter part of September to 83.2 in the middle of October.

The board reported that at steel mills, where output in August was at a high level, activity was reduced to an average of 75 per cent of capacity in September and to an estimated rate of 52 per cent of capacity in the fourth week of October.

Contrary to the usual seasonal increase, production declines were reported at woolen mills, shoe factories and sugar refineries. Increases in output were recorded by silk mills and meat-packing establishments, where activity recently had been at a low level.

Factory employment showed little change from August to September, although there is usually an increase at that time of the year. The levels of employment and payrolls, however, continued to be considerably above the levels of last year.

The board's total production index, although it showed a marked decline from August to September, was higher than in September, 1936. Its adjusted index for factory employment and payrolls was 100.7 in September, compared with 102.4 in August and 93.8 in September, 1936.

The Federal Reserve System reported that industrial production for the first nine months of this year reached the highest average since 1929 and was 15 per cent above the like period of 1936 despite a sharp drop in September.

Manufacturers sales showed a gain of about 11 per cent during September, as compared with September, 1936, while the rate of collections on accounts receivable decreased slightly according to reports from manufacturers cooperating in the monthly joint study of the National Association of Credit Men and the Bureau of Foreign and Domestic Commerce.

Without adjustment for seasonal influences, September, 1937, sales were almost 4 per cent higher than for August, 1937, but the rate of collections was somewhat lower than last month.

All of the industry groups represented in this study recorded gains over September 1936, the largest being for the machinery group followed by the rubber products group. Chemicals and allied products showed a gain of 12.6 per cent over August and 13.9 per cent over September 1936. Paints and varnishes gained 1.6 per cent over September 1936 but sales were 6.7 per cent lower than in August. Leather and its products fell 10.4 per cent under August but bettered September last year by 3.2 per cent. Paper sales improved over both August and September last year, the gains being 4.2 per cent and 4.8 per cent respectively. Stone, clay, and glass products were 1.1 per cent ahead of August and 13.5 per cent above September 1936. Sales of textiles also made a favorable with gains of 3.2 per cent and 6 per cent over those for August and September 1936.

Production of chemicals in September was variously reported with some branches maintaining an unchanged rate of operations, others cutting down because of slower consuming demand. Seasonal influences had some effect as in the case of denatured alcohol where the output was speeded up in order to build up stocks for the anti-freeze trade.

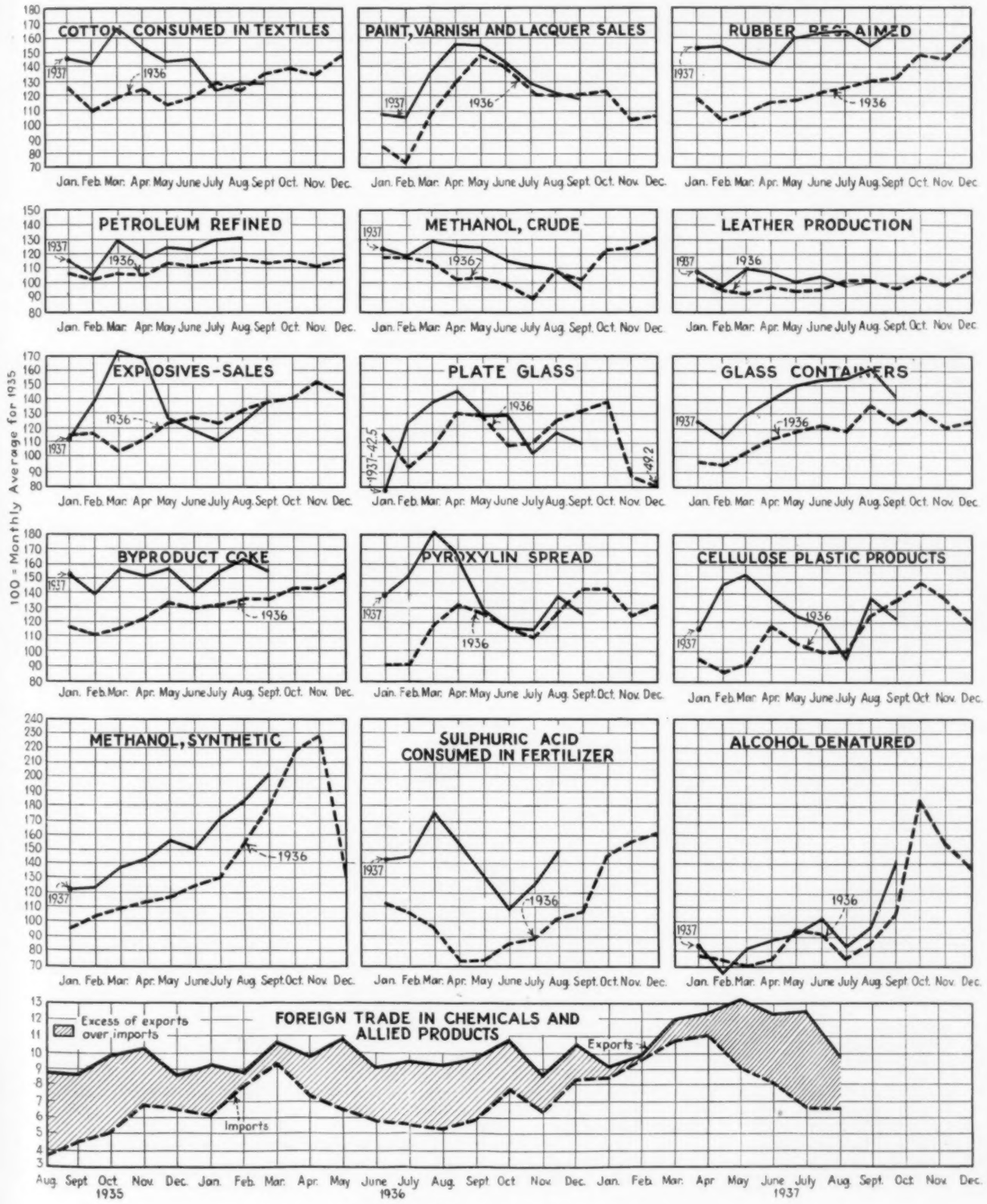
While the automobile trade went into production of new models earlier than a year ago, actual and prospective sales for the latter part of this year are not so promising. Production in October was about 360,000 units which would make the ten-month total a little over 4,150,000 which is about 300,000 below the full year output in 1936. Consumption of chemicals in that industry, therefore, was larger in October than in the corresponding month last year but promises to fall below last year's figures for the last two months of the year.

In the glass industry, the container branch had a slightly higher output in September than in August but the opposite was true of plate glass and container output is said to have dropped in October.

Materials Used in Canadian Soap Industry

Materials	Unit of measure	1935 Quantity	1935 Cost at works	1936 Quantity	1936 Cost at works
Chlorinated lime	lb.	1,098,519	$24,601	1,094,322	$25,569
Cocoanut oil	lb.	26,733,467	1,235,109	24,621,117	1,304,849
Corn oil	lb.	17,474	1,301	16,180	1,253
Cottonseed oil	lb.	172,718	7,469	35,693	1,622
Essential oils and perfumes	.....	.....	308,930	.....	349,342
Ethyl alcohol	Imp. gal.	2,628	3,374	5,707	5,873
Fatty acids (stearic, etc)	lb.	890,391	55,650	1,654,355	78,500
Feldspar	ton	1,257	12,817	939	10,221
Fish oils	lb.	8,958,757	358,360	6,978,487	257,485
Foots (cottonseed, etc)	lb.	6,690,098	356,738	6,361,809	371,716
Fullers' earth	lb.	660,018	13,694	1,328,219	20,601
Glycerine, crude	lb.	2,179,706	178,568	2,332,593	214,945
Glycerine, refined	lb.	41,246	6,332	41,718	7,060
Liquid chlorine	lb.	423,882	21,526	539,661	26,499
Linseed oil	Imp. gal.	26,516	15,581	27,941	17,554
Olive oil	lb.	5,694	716	1,339	187
Palm oil	lb.	22,518,413	871,779	24,399,755	1,029,669
Palm kernel oil	lb.			2,737,027	123,675
Peanut oil	lb.	977,903	48,529	982,100	60,143
Petrolatum	lb.	159,944	3,136	115,777	1,851
Potassium hydroxide	lb.	197,618	13,538	309,166	18,485
Rosin	lb.	5,612,798	155,481	4,522,498	138,637
Silica sand	ton	4,419	72,626	4,918	79,020
Sodium carbonate	lb.	9,171,493	145,415	9,063,966	160,331
Sodium hydroxide	lb.	19,221,107	613,139	18,510,747	523,164
Sodium chloride	lb.	5,695,451	25,588	5,480,103	36,474
Sodium silicate	lb.	26,464,951	235,039	28,706,889	236,787
Soya bean oil	lb.	539,187	26,679	1,321,367	76,282
Talc	lb.	279,224	2,583	256,014	2,680
Tallow, grease, and other soap stock	lb.	36,305,065	2,039,878	35,734,490	1,939,027
Trisodium phosphate	lb.	2,353,715	66,139	2,642,187	72,565
Whale oil	lb.	7,840,853	266,523	1,904,488	82,020
All other materials	.....	.....	255,237	.....	186,866
Containers, etc.	.....	.....	1,538,628	.....	1,660,270
Total	.....	.....	8,980,703	.....	9,121,222

TRENDS OF PRODUCTION AND CONSUMPTION



SLOWER TRADING MOVEMENT WEAKENS PRICES FOR CHEMICALS

SEVERAL of the industries which are large consumers of chemicals have been restricting manufacturing operations and in consequence have been using less chemicals and other raw materials than had been expected. Naturally this has had a direct bearing on the market for chemicals and the setback in general business makes it necessary to make some revisions in earlier estimates for chemical production and consumption. Textiles, building, glass, tanning, and automotive industries may be cited as cases where recent activity has fallen short of anticipations as consumers of chemicals.

The slower trading movement has been a factor in aiding the downward tendency of prices. Sulphuric acid is now in larger supply following the decline in fertilizer and steel demand and while quotations for the acid are holding steady, the tone is easier especially for prompt shipment.

Some of the insecticide chemicals have been marked up in price, including lead arsenate and Paris green but price changes in general have favored the declining side of the market. Lead salts, copper sulphate, tin salts, formic acid, casein, turpentine and rosins, and carbon black may be mentioned among the products which have been reduced in price. With labor and other producing costs higher for many chemicals, a decline in the volume of chemical output would increase unit costs and either wipe out profit margins or force an upward price adjustment.

Values for vegetable oils and animal fats likewise have been tending downward. The prospective large supply of cottonseed is a basic factor and has been aided by the buying attitude of large consuming industries. Actually the cotton oil situation is not so weak as it seems. It is true that production this season will be unusually large but there are offsetting factors. In the first place the Federal Surplus Commodities Corp. has been reported as planning to buy both crude and refined cottonseed oil for conversion into shortening for distribution by state relief agencies. Furthermore normal consumption of oil has been going along at a very high rate which if continued would largely nullify any bearish aspects of the larger potential supply.

China wood oil importations have been halted by the blockade of Chinese ports and trading is practically at a standstill with prices nominal. Stocks of wood oil on hand in this country at the end of September were larger than usual, amounting to 58,908,641 lb. compared with 28,872,045 lb. on January 1 and 44,753,882 lb. at the end of September last year.

A price schedule for anhydrous ammonia has been issued, effective November 1, whereby spot stocks are offered at distributing points throughout the country. The prices quoted show a range according to point of shipment with freight rates accounting for the differences. Contracts also are included in the schedule of prices with New York deliveries offered at 15½¢ a lb. in cylinders.

The 1938 Agricultural Conservation program for gum naval stores has been approved by the Secretary of Agriculture. The program, a part of the general 1938 Agricultural Conservation Program, was worked out recently by representatives of the American Turpentine Farmers' Association, the AAA, and the Forest Service at conferences held in Washington and in the field. It will be administered by the Forest Service.

Gum naval stores farmers in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas will be given opportunity to participate, and will be eligible to receive payments for working only the larger trees and otherwise protecting the growth of their pines. These eight states produce approximately 70 per cent of the world's gum naval stores.

For cooperation in the program in 1938 naval stores farmers will be paid 1 cent per "face" (chipped area of the tree from which the gum flows) for all faces worked under approved practices, and 5 cents per face for faces taken out of operation on small trees as required by the provisions of the program. On a basis of 80 per cent participation, payments at these rates would total slightly more than $1,300,000.

Among developments in outside markets it is reported that due mainly to the increased output of synthetic fibers in recent years, world production of carbon bisulphide has more than doubled since 1929. A German survey indicates that world production last year aggregated 260,000 metric tons against 110,000 tons in 1929, and that 90 per cent of the current output is accounted for by six countries—Germany, Japan, the United States, Italy, the United Kingdom, and France.

Military activities in and around Shanghai have dealt a severe blow to the chemical industry of that metropolis. Imports of coal-tar dyes into Shanghai are reported to have ceased almost altogether but textile mills normally carry several months supply on hand.

A kelp-gathering project which contemplates the employment of 50 men and an outlay of from $25,000 to $35,000 in capital, is reported from Nova Scotia. A warehouse is to be constructed on Cape Sable Island where kelp will be collected for shipment to the United States. The southern coast of Nova Scotia is said to have the most prolific kelp beds known.

A report from Buenos Aires says that, the denaturing of acetic acid is obligatory in Argentina in order to prohibit its use in the manufacture of vinegar. Before leaving a factory, customhouse, or place of storage, acetic acid must be denatured with furfural (technical grade) in the proportion of one to one thousand. Other denaturing substances may be employed if sanctioned by the National Chemical Office. Provision will be made for denaturing the acetic acid which is imported without having complied with such requirements. A prior chemical analysis by the Natonal Chemical Office is also required of all acetic acid, imported or mnufactured locally.

Pure acetic acid for laboratory or pharmaceutical use is excepted from the above requirements, provided it is imported or offered by local producers in glass containers of not more than one kilo, and consigned to laboratories or pharmacies duly registered with the authorities. Argentina imported 731 tons of acetic acid in 1936. Europe has been the chief supplier in the past.

CHEM. & MET. Weighted Index of CHEMICAL PRICES

Base = 100 for 1927

This month	**89.59**
Last month	90.21
November, 1936	86.70
November, 1935	87.20

Declines in prices were reported for many metal salts including lead oxides, basic carbonate of lead, copper sulphate, and tin salts. Spirits of turpentine also held a lower average price over the last month.

CHEM. & MET. Weighted Index of Prices for OILS AND FATS

Base = 100 for 1927

This month	**83.11**
Last month	84.78
November, 1936	91.36
November, 1935	92.20

China wood oil is largely nominal with linseed fairly stable. Crude cottonseed oil was lower and this held true for palm and coconut oils. Tallow and other animal fats also were lower.

Current PRICES

INDUSTRIAL CHEMICALS

	Current Price	Last Month	Last Year
Acetone, drums, lb.	$0.06 –$0.07	$0.06 –$0.07	$0.08 –$0.09
Acid, acetic, 28%, bbl., cwt.	2.38 – 2.63	2.38 – 2.63	2.45 – 2.70
Glacial 99%, drums	8.43 – 8.68	8.43 – 8.68	8.43 – 8.68
U. S. P. reagent	10.25 –10.50	10.25 –10.50	10.52 –10.77
Boric, bbl., ton	105.00–115.00	105.00–115.00	105.00–115.00
Citric, kegs, lb.	.24 – .27	.24 – .27	.25 – .28
Formic, bbl., ton	.10½– .11	.11 – .11½	.11 – .11½
Gallic, tech., bbl., lb.	.75 – .78	.75 – .78	.60 – .65
Hydrofluoric 30% carb., lb.	.07 – .07½	.07 – .07½	.07 – .07½
Lactic, 44%, tech., light, bbl., lb.	.06½– .06¾	.06½– .06¾	.11½– .12
Muriatic, 18°, tanks, cwt.	1.05 –.....	1.05 –.....	1.00 – 1.10
Nitric, 36°, carboys, lb.	.05 – .05½	.05 – .05½	.05 – .05½
Oleum, tanks, wks., ton	18.50 –20.00	18.50 –.....	18.50 –20.00
Oxalic, crystals, bbl., lb.	.10½– .12	.10½– .12	.11½– .12½
Phosphoric, tech., c'bys., lb.	.09 – .10	.09 – .10	.09 – .10
Sulphuric, 60°, tanks, ton	13.00 –.....	13.00 –.....	11.00 –11.50
Sulphuric, 66°, tanks, ton	16.50 –.....	16.50 –.....	15.50 –.....
Tannic, tech., bbl., lb.	.40 – .45	.40 – .45	.20 – .30
Tartaric, powd., bbl., lb.	.24½– .25½	.24½– .25½	.24 – .25
Tungstic, bbl., lb.	2.75 –.....	2.75 –.....	2.50 – 2.75
Alcohol, Amyl	–.....	–.....	–.....
From Pentane, tanks, lb.	.12⅓–.....	.12⅓–.....	.14⅓–.....
Alcohol, Butyl, tanks, lb.	.08½–.....	.08½–.....	.08½–.....
Alcohol, Ethyl, 190p'f., bbl., gal.	4.14 –.....	4.14 –.....	4.14 –.....
Denatured, 190 proof			
No. 1 special, dr., gal wks.	.34 –.....	.34 –.....	.32 –.....
Alum, ammonia, lump, bbl., lb.	.03 – .04	.03 – .04	.03 – .04
Potash, lump, bbl., lb.	.03½– .04	.03½– .04	.03 – .04
Aluminum sulphate, com bags cwt.	1.35 – 1.50	1.35 – 1.50	1.35 – 1.50
Iron free, bg., cwt.	2.00 – 2.25	2.00 – 2.25	2.00 – 2.25
Aqua ammonia, 26°, drums, lb.	.02½– .03	.02½– .03	.02½– .03
tanks, lb.	.02½– .02¾	.02½– .02¾	.02½– .02¾
Ammonia, anhydrous, cyl., lb.	.15½–.....	.16.. ...	.15½– .16
tanks, lb.	.04½–.....	.04½–.....	.04½–.....
Ammonium carbonate, powd tech., casks, lb.	.08 – .12	.08 – .12	.08 – .12
Sulphate, wks., cwt.	1.40 –.....	1.42½–.....	1.25 –.....
Amylacetate tech., tanks, lb.	.11½– .12	.11½– .12	.12 –.....
Antimony Oxide, bbl., lb.	.15½– .16	.15½– .16	.12½– .13
Arsenic, white, powd., bbl., lb.	.03 – .03½	.03 – .03½	.03½– .04
Red, powd., kegs, lb.	.15½– .16	.15½– .16	.15½– .16
Barium carbonate, bbl., ton	52.50 –57.50	52.50 –57.50	56.50 –58.00
Chloride, bbl., ton	72.00 –74.00	72.00 –74.00	72.00 –74.00
Nitrate, cask, lb.	.07 – .08	.07 – .08	.08½– .09
Blanc fixe, dry, bbl., lb.	.03½– .04	.03½– .04	.03½– .04
Bleaching powder, f. o. b., wks., drums, cwt.	2.00 – 2.10	2.00 – 2.10	2.00 – 2.10
Borax, gran., bags, ton	46.00 –51.00	46.00 –51.00	44.00 –49.00
Bromine, cs., lb.	.36 – .38	.36 – .38	.36 – .38
Calcium acetate, bags	1.95 –.....	1.95 –.....	2.10 –.....
Arsenate, dr., lb.	.06½– .07	.06½– .07	.06 – .07
Carbide drums, lb.	.05 – .06	.05 – .06	.05 – .06
Chloride, fused, dr., del., ton	20.00 –33.00	20.00 –33.00	20.00 –33.00
flake, dr., del., ton	22.00 –35.00	22.00 –35.00	22.00 –35.00
Phosphate, bbl., lb.	.07½– .08	.07¼– .08	.07½– .08
Carbon bisulphide, drums, lb.	.05 – .06	.05 – .06	.05½– .06
Tetrachloride drums, lb.	.05½– .08¾	.05½– .06	.05½– .06
Chlorine, liquid, tanks, wks., lb.	2.15 –.....	2.15 –.....	2.15 –.....
Cylinders	.05½– .06	.05½– .06	.05½– .06
Cobalt oxide, cans, lb.	1.67 – 1.70	1.67 – 1.70	1.41 – 1.51
Copperas, bgs., f.o.b., wks., ton	15.00 –16.00	15.00 –16.00	15.00 –16.00
Copper carbonate, bbl., lb.	.09 – 16½	.10½– .19	.11½– .16
Sulphate, bbl., cwt.	4.75 – 5.00	5.15 – 5.40	4.00 – 4.25
Cream of tartar, bbl., lb.	.19½– .20	.19½– .20	.16½– .17
Diethylene glycol, dr., lb.	.22 – .23	.22 – .23	.16½– .20½
Epsom salt, dom., tech., bbl., cwt.	1.80 – 2.00	1.80 – 2.00	1.80– 2.00
Ethyl acetate, drums, lb.	.07½–.....	.07¼–.....	.07 –.....
Formaldehyde, 40%, bbl., lb.	.05½– .06½	.05½– .06½	.06 – .07
Furfural, dr., lb.	.10 – .17½	.10 – .17½	.10 – .17½
Fusel oil, ref. drums, lb.	.16 – .18	.16 – .18	.16 – .18
Glaubers salt, bags, cwt.	.95 – 1.00	.95 – 1.00	.85 – 1.00
Glycerine, c.p., drums, extra, lb.	.21½–.....	.23½–.....	.19½–.....
Lead:			
White, basic carbonate, dry casks, lb.	.07½–.....	.08 –.....	.06½–.....
White, basic sulphate, sck., lb.	.07½–.....	.07½–.....	.06 –.....
Red, dry, sck, lb.	.07½–.....	.08 –.....	.07 –.....
Lead acetate, white crys., bbl., lb.	.12 – .13	.12 – .13	.10½– .11
Lead arsenate, powd., bbl., lb.	.13 – .13¼	.11½– .12	.09 – .10
Lime, chem., bulk, ton	8.50 –.....	8.50 –.....	8.50 –.....
Litharge, pwd., csk., lb.	.07½–.....	.08 –.....	.06 –.....
Lithophone, bags, lb.	.04½– .04¾	.04¾– .04¾	.04½– .05
Magnesium carb., tech., bags, lb.	.06 – .06½	.06 – .06½	.06 – .06½

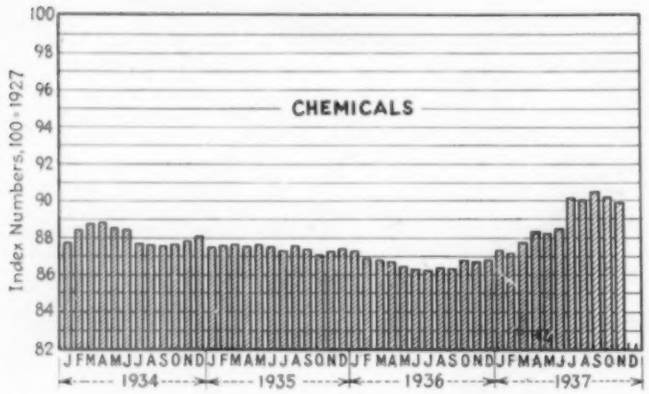
	Current Price	Last Month	Last Year
Methanol, 95%, tanks, gal.	.31 –.....	.31 –.....	.33 –.....
97%, tanks, gal.	.32 –.....	.32 –.....	.34 –.....
Synthetic, tanks, gal.	.33 –.....	.33 –.....	.35½–.....
Nickel salt, double, bbl., lb.	.13 – .13¼	.13 – .13¼	.13 – .13¼
Orange mineral, csk., lb.	.10½–.....	.11½–.....	.10 –.....
Phosphorus, red, cases, lb.	.40 – .42	.40 – .42	.44 – .45
Yellow, cases, lb.	.24 – .30	.24 – .30	.28 – .32
Potassium bichromate, casks, lb.	.08½– .09	.08½– .09	.08½– .09
Carbonate, 80–85%, calc. csk., lb.	.06½–.....	.06½–.....	.07 – .07½
Chlorate, powd., lb.	.09½–.....	.09½– .09	.08 – .08½
Hydroxide (c'stic potash), dr., lb.	.07 – .07½	.07 – .07½	.06½– .06¾
Muriate, 80% bgs., ton	23.00 –.....	23.00 –.....	22.00 –.....
Nitrate, bbl. lb.	.05½– .06	.05½– .06	.05½– .06
Permanganate, drums, lb.	.18½– .19	.18½– .19	.18½– .19
Prussiate, yellow, casks, lb.	.15 – .16	.15 – .16	.18 – .19
Sal ammoniac, white, casks, lb.	.05 – .05½	.05 – .05½	.04½– .05
Salsoda, bbl., cwt.	1.00 – 1.05	1.00 – 1.05	1.00 – 1.05
Salt cake, bulk, ton	13.00 –15.00	13.00 –15.00	13.00 –15.00
Soda ash, light, 58%, bags, contract, cwt.	1.23 –.....	1.23 –.....	1.23 –.....
Dense, bags, cwt.	1.25 –.....	1.25 –.....	1.25 –.....
Soda, caustic, 76%, solid, drums, contract, cwt.	2.60 – 3.00	2.60 – 3.00	2.60 – 3.00
Acetate, works, bbl., lb.	.04½– .05	.04½– .05	.04½– .05
Bicarbonate, bbl., cwt.	1.75 – 2.00	1.75 – 2.00	1.85 – 2.00
Bichromate, casks, lb.	.06½– .07	.06½– .07	.06½– .07
Bisulphate, bulk, ton	15.00 –16.00	15.00 –16.00	15.00 –16.00
Bisulphite, bbl., lb.	.03½– .04	.03½– .04	.03 – .04
Chlorate, kegs, lb.	.06½– .06¾	.06½– .06¾	.06½– .06¾
Chloride, tech., ton	12.00 –14.75	12.00 –14.75	12.00 –14.75
Cyanide, cases, dom., lb.	.16½– .17	.16½– .17	.15½– .16
Fluoride, bbl., lb.	.07½– .08	.07½– .08	.07½– .08
Hyposulphite, bbl., cwt.	2.40 – 2.50	2.40 – 2.50	2.40 – 2.50
Metasilicate, bbl., cwt.	2.15 – 3.15	2.15 – 3.15	2.90 – 3.00
Nitrate, bags, cwt.	1.45 –.....	1.45 –.....	1.29 –.....
Nitrite, casks, lb.	.07 – .08	.07 – .08	.07½– .08
Phosphate, dibasic, bbl., lb.	1.70 –.....	1.70 –.....	.02¾– .024
Prussiate, yel. drums, lb.	.10 – .11	.10– .11	.11½– .12
Silicate (40° dr.) wks., cwt.	.80 – .85	.80 – .85	.80 – .85
Sulphide, fused, 60–62%, dr., lb.	.02½– .03¼	.02½– .03	.02½– .03
Sulphite, cyrs., bbl., lb.	.02½– .02¾	.02½– .02¾	.02½– .02¾
Sulphur, crude at mine, bulk, ton	18.00 –.....	18.00 –.....	18.00– .....
Chloride, dr., lb.	.03 – .04	.03 – .04	.03½– .04
Dioxide, cyl., lb.	.07 – .08	.06½– .08	.07 – .07½
Flour, bag, cwt.	1.60 – 3.00	1.60 – 3.00	1.60 – 3.00
Tin Oxide, bbl., lb.	.52 –.....	.60 –.....	.52 –.....
Crystals, bbl., lb.	.34 –.....	.40 –.....	.38½–.....
Zinc. chloride, gran., bbl., lb.	.05 – .06	.05 – .06	.05 – .06
Carbonate, bbl., lb.	.14 – .15	.14 – .15	.09 – .11
Cyanide, dr., lb.	.36 – .38	.36 – .38	.36 – .38
Dust, bbl., lb.	.077–.....	.084–.....	.068–.....
Zinc oxide, lead free, bag., lb.	.06½–.....	.06½–.....	.05½–.....
5% lead sulphate, bags, lb.	.06½–.....	.06½–.....	.05½–.....
Sulphate, bbl., cwt.	3.15 – 3.60	3.15 – 3.60	2.65 – 3.00

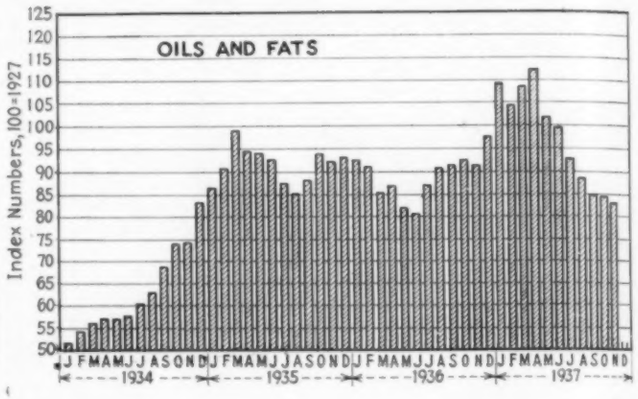
OILS AND FATS

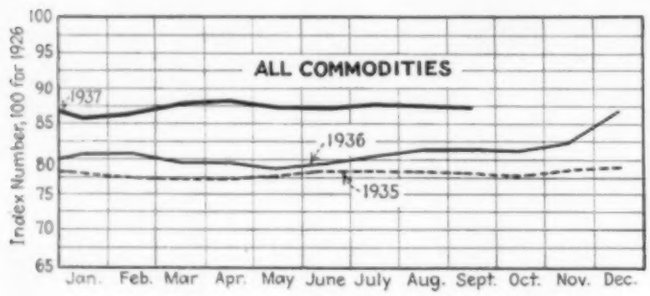
	Current Price	Last Month	Last Year
Castor oil, No. 3, bbl., lb.	$0.10½–$0.11	$0.10½–$0.11	$0.10 –$0.11
Chinawood oil, bbl., lb.	.17 –.....	.25 –.....	.13½–.....
Coconut oil, Ceylon, tanks, N. Y. lb.	.04¾–.....	.05 –.....	.06¼–.....
Corn oil crude, tanks (f.o.b. mill), lb.	.06¾	.06½–.....	.08½–.....
Cottonseed oil, crude (f.o.b. mill), tanks, lb.	.06 –.....	.05½–.....	.08½–.....
Linseed oil, raw car lots, bbl., lb.	.108–.....	.11 –.....	.094–.....
Palm, casks, lb.	.04½–.....	.05 –.....	.05 –.....
Peanut oil, crude, tanks (mill), lb.	.07½–.....	.06¾–.....	.08½–.....
Rapeseed oil, refined, bbl., gal.	.92 –.....	.96 –.....	.73 –.....
Soya bean, tank, lb.	.06 –.....	.06½–.....	.08¼–.....
Sulphur (olive foots), bbl., lb.	.09½–.....	.10 –.....	.09½–.....
Cod, Newfoundland, bbl., gal.	.52 –.....	.52 –.....	.43 –.....
Menhaden, light pressed, bbl., lb.	.074–.....	.074–.....	.067–.....
Crude, tanks (f.o.b. factory), gal.	.35 –.....	.35 –.....	.30 –.....
Grease, yellow, loose, lb.	.05½–.....	.05½–.....	.06¼–.....
Oleo stearine, lb.	.09 –.....	.10 –.....	.10 –.....
Red oil, distilled, d.p. bbl., lb.	.10½–.....	.10½–.....	.09½–.....
Tallow extra, loose, lb.	.06½–.....	.07½–.....	.06½–.....

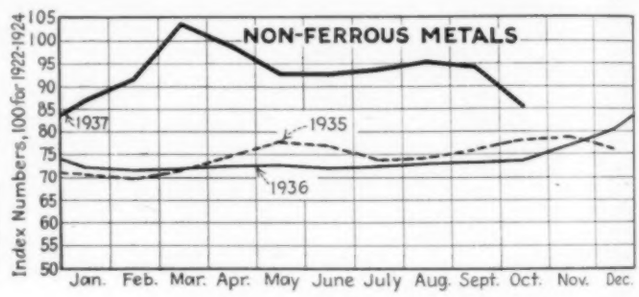
The accompanying prices refer to round lots in the New York market. Where it is the trade custom to sell f.o.b. works, quotations are given on that basis and are so designated. Prices are corrected to November 12

CHEM. & MET.'S WEIGHTED PRICE INDEXES









COAL-TAR PRODUCTS

	Current Price	Last Month	Last Year
Alpha-napthol, crude, bbl., lb.	$0.52 -$0.55	$0.52 -$0.55	$0.60 -$0.62
Alpha-naphthylamine, bbl., lb.	.32 - .34	.32 - .34	.32 - .34
Aniline oil, drums, extra, lb.	.15 - .16	.15 - .16	.14½- .15
Aniline salts, bbl., lb.	.22 - .24	.22 - .24	.24 - .25
Benzaldehyde, U.S.P., dr., lb.	.85 - .95	.85 - .95	1.10 - 1.25
Benzidine base, bbl., lb.	.70 - .75	.70 - .75	.65 - .67
Benzoic acid, U.S.P., kgs., lb.	.52 - .54	.52 - .54	.48 - .52
Benzyl chloride, tech., dr., lb.	.25 - .27	.25 - .27	.30 - .35
Benzol, 90%, tanks, works, gal.	.16 - .18	.16 - .18	.16 - .18
Beta-napthol, tech., drums, lb.	.23 - .24	.23 - .24	.24 - .27
Cresol, U.S.P., dr., lb.	.12 - .13	.12 - .13	.10 - .11
Cresylic acid, 99%, dr., wks., gal.	.92 - 1.00	.92 - 1.00	.73 - .75
Diethylaniline, dr., lb.	.50 - .55	.50 - .55	.55 - .58
Dinitrophenol, bbl., lb.	.23 - .25	.23 - .25	.29 - .30
Dinitrotoluen, bbl., lb.	.15 - .16	.15 - .16	.16 - .17
Dip oil, 25%, dr., gal.	.23 - .25	.23 - .25	.23 - .25
Diphenylamine, bbl., lb.	.32 - .36	.32 - .36	.38 - .40
H-acid, bbl., lb.	.50 - .55	.50 - .55	.65 - .70
Naphthalene, flake, bbl., lb.	.07½- .07¾	.07½- .07¾	.07½- .07¾
Nitrobensene, dr., lb.	.08 - .09	.08 - .09	.08¾- .10
Para-nitraniline, bbl., lb.	.45 - .47	.45 - .47	.51 - .55
Phenol, U.S.P., drums, lb.	.14½-	.14½-	.14½- .15
Picric acid, bbl., lb.	.35 - .40	.35 - .40	.30 - .40
Pyridine, dr., gal.	1.55 - 1.60	1.55 - 1.60	1.10 - 1.15
Resorcinal, tech., kegs, lb.	.75 - .80	.75 - .80	.65 - .70
Salicylic acid, tech., bbl., lb.	.34 - .40	.34 - .40	.40 - .42
Solvent naptha, w.w., tanks, gal.	.30 -	.30 -	.26 -
Toludine, bbl., lb.	.88 - .90	.88 - .90	.88 - .90
Toluene, tanks, works, gal.	.35 -	.35 -	.30 -
Xylene, com, tanks, gal.	.35 -	.35 -	.30 -

MISCELLANEOUS

	Current Price	Last Month	Last Year
Barytes, grd., white, bbl., ton.	$22.00-$25.00	$22.00-$25.00	$22.00-$25.00
Casein, tech., bbl., lb.	.12½- .13	.13 - .14	.17½- .18½
China clay, dom., f.o.b. mine, ton.	8.00 -20.00	8.00 -20.00	8.00 -20.00
Dry colors			
Carbon gas, black (wks.), lb.	.0395- .20	.04 - .20	.04 - .20
Prussian blue, bbl., lb.	.37 - .38	.37 - .38	.37 - .38
Ultramarine blue, bbl., lb.	.10 - .26	.10 - .26	.10 - .26
Chrome green, bbl., lb.	.21 - .37	.21 - .37	.26 - .37
Carmine red, tins, lb.	4.00 - 4.40	4.00 - 4.40	4.00 - 4.40
Para toner, lb.	.75 - .80	.75 - .80	.80 - .85
Vermilion, English, bbl., lb.	1.65 - 1.70	1.75 - 1.80	1.59 - 1.60
Chrome yellow, C. P., bbl., lb.	.14½- .15½	.14½- .15½	.12 - .14
Feldspar, No. 1 (f.o.b. N.C.), ton.	6.50 - 7.50	6.50 - 7.50	6.50 - 7.50
Graphite, Ceylon, lump, bbl., lb.	.06 - .06½	.06 - .06½	.07 - .08½
Gum copal Congo, bags, lb.	.08 - .30	.08 - .30	.08 - .30
Manila, bags, lb.	.08½- .14	.08½- .14	.09 - .14
Damar, Batavia, cases, lb.	.16 - .24	.16 - .24	.15½- .16
Kauri cases, lb.	.18½- .60	.18½- .60	.19 - .25
Kieselguhr (f.o.b. N. Y.), ton.	50.00 -55.00	50.00 -55.00	50.00 -55.00
Magnesite, calc, ton	50.00 -	50.00 -	50.00 -
Pumice stone, lump, bbl., lb.	.05 - .07	.05 - .08	.05 - .07
Imported, casks, lb.	.03 - .40	.03 - .40	.03 - .35
Rosin, H., bbl.	7.75 -	8.80 -	8.00 -
Turpentine, gal.	.31½-	.32 -	.42½-
Shellac, orange, fine, bags, lb.	.22 -	.22 -	.25 -
Bleached, bonedry, bags, lb.	.17 -	.17½-	.17½-
T. N. Bags, lb.	.12 -	.12½-	.13½-
Soapstone (f.o.b. Vt.), bags, ton.	10.00 -12.00	10.00 -12.00	10.00 -12.00
Talc, 200 mesh (f.o.b. Vt.), ton.	8.00 - 8.50	8.00 - 8.50	8.00 - 8.50
300 mesh (f.o.b. Ga.), ton.	7.50 -10.00	7.50 -10.00	7.50 -11.00
225 mesh (f.o.b. N. Y.), ton.	13.75 -	13.75 -	13.75 -

INDUSTRIAL NOTES

WILSON & BENNETT MFG. CO., Chicago, has appointed John T. Gossett eastern sales manager with headquarters in the Jersey City office.

THE TERRY STEAM TURBINE CO., Hartford, Conn., has the following new representatives: C. F. Cate, El Paso, Texas; The Darby Corp., Kansas City, Kans.; and Ray Riddle, Tulsa, Okla.

THE LINCOLN ELECTRIC CO., Cleveland, has placed Arthur T. Cox, Jr., in charge of its Tri-Cities welding sales-engineering office at Moline, Ill.

GRAHAM TRANSMISSIONS, Milwaukee, is now represented in St. Louis by R. L. Johnstone; in Akron by Chas. C. Grant; and in Detroit by George P. Coulter.

PURITAN COMPRESSED GAS CORP., Kansas City, has opened sales branches and warehouses in New York and Philadelphia.

THE KENNEDY VALVE MFG. CO., Elmira, N. Y., has appointed Fred C. Greaves its representative in Oregon and Washington with headquarters in the Poison Bldg., Seattle.

KELP LABORATORIES, San Diego, Calif., has moved its office to 3564 First Ave.

ROLLER-SMITH CO., New York, has made C. F. Cate, 234 N. Davis St., El Paso, Texas, its agent for southwestern Texas and southern New Mexico.

New CONSTRUCTION

Where Plants Are Being Built in Process Industries

	Current Projects		Cumulative 1937	
	Proposed Work	Contracts	Proposed Work	Contracts
New England	$50,000	$80,000	$1,585,000	$2,612,000
Middle Atlantic	1,140,000	260,000	17,292,000	16,436,000
South	4,000,000	1,958,000	29,595,000	38,363,000
Middle West	40,000	699,000	13,553,000	22,487,000
West of Mississippi	2,915,000	3,040,000	18,337,000	11,468,000
Far West	3,000,000	450,000	8,835,000	10,748,000
Canada	7,100,000	6,256,000	33,280,000	8,282,000
Total	$18,245,000	$12,743,000	$122,477,000	$110,396,000

PROPOSED WORK

Chemical Plant—Hilton-Davis Chemical Co., Langdon Rd. and Pennsylvania R. R., Cincinnati, O., plans to construct new office and laboratory buildings, new color and pigment building and also purchase equipment for these buildings as well as other equipment. Cost will be defrayed by issue of preferred and common stock.

Chemical Plant—Stanolind Oil Co., Philcade Bldg., Tulsa, Okla., plans to construct a chemical manufacturing plant. Estimated cost $50,000.

Factory—Eastman Kodak Co., Kodak Park, Rochester, N. Y., has purchased a site on St. Paul St. and plans to construct an addition to the Hawkeye Works. Estimated cost will exceed $100,000.

Fertilizer Plant—Rogers & Hubbard, Connecticut River East Bank, Portland, Conn., are receiving bids for the construction of a fertilizer plant to replace the one destroyed by fire. Estimated cost $50,000.

Laboratory—Carnegie Illinois Steel Corp., Carnegie Bldg., Pittsburgh, Pa., is having plans prepared by Rust Engineering Co., Clark Bldg., Pittsburgh, Pa., for 19 new units at its plant to include metallurgical and testing laboratories.

Laboratory—Corning Glass Works, Walnut St., Corning, N. Y., plans to construct a 4 story, 80x120 ft. laboratory. Estimated cost will exceed $400,000.

Laboratory—International Nickel Co., 67 Wall St., New York, N. Y., has had plans prepared by Epple & Kahrs, Archts., 17 Washington St., Newark, for the construction of a laboratory, foundry, etc., on Hobart Ave., Bayonne, N. J. Estimated cost $100,000.

Laboratory—Rensselaer Polytechnic Institute, Troy, N. Y., plans to construct a complete modern welding laboratory.

Paint Factory—Tremco Manufacturing Co., Ltd., Wickstead Ave., Leaside, Ont., Can., manufacturer of paint and varnish, plans to construct an extension to its factory. Equipment will be purchased. Estimated cost $100,000.

Pulp Mill—Huron Forest Products, Ltd., c/o Walter E. Caten, Room 950, 230 Park Ave., New York, N. Y., plans to construct a pulp mill on the north shore of Lake Huron in the Province of Ontario. Estimated cost $3,000,000.

Rayon Mill—Rayonier Mills, Inc., Fernandina, Fla., contemplates the construction of a rayon pulp plant. Estimated cost will exceed $1,000,000.

Gasoline Plant—Arkansas-Louisiana Oil Co., subsidiary of Cities Service, Marshall, Tex., plans to construct a casinghead gasoline absorption plant in the Rodessa oil field about 4 mi. from Jefferson, Tex. Estimated cost $450,000.

Refinery—Pontiac Refining Co., Corpus Christi, Tex., plans to construct two steel storage tanks of approximately 80,000 bbl. each. Mid-Continent Engineering Co., Corpus Christi and Dallas, Engr. Estimated cost $100,000.

Refinery—Pure Oil Co., Chicago, Ill., and Nederland, Tex., R. L. Vernon, Plant Supt., plans to expand its plant to increase daily output of crude oil by several thousand barrels above present 27,000 bbl. daily capacity. Plans include construction of condenser to increase crude oil capacity, vaporizing units, etc. Some contracts, particularly machinery and equipment, will be let by contract, some of general construction will be by day labor and some by contract. Estimated cost $2,275,000.

Refinery—Standard Oil Co. of Louisiana, Baton Rouge, La., plans to construct an addition to its plant for the production of aviation gasoline. Estimated cost $3,000,000.

Oil Processing Building — Proctor & Gamble Manufacturing Co., 1151 South Bway., Los Angeles, Calif., will soon take bids for the construction of an oil processing building at its plant at 1607 West 7th St., Long Beach, Calif. Estimated cost $3,000,000.

Sulphite Mill—Marathon Paper Co., c/o General Timber Co., Ltd., Canadian Pacific Ry. Bldg., Toronto, Ont., Can., plans to construct a sulphite mill and townsite on the Big Pic River, Port Arthur, Ont. Estimated cost $4,000,000.

Warehouse—Gulf Refining Corp., Port Arthur, Tex., will soon award the contract for a 1 story, 83x175 ft. barreling storage or warehouse building. Estimated cost will exceed $40,000.

CONTRACTS AWARDED

Abrasives Plant—Canadian Abrasive Co., Ltd., Arvida, Que., Can., has awarded separate contracts for the construction of an abrasive plant. Estimated cost $40,000.

Carbon Black Plant—Columbian Carbon Co., Port Arthur, Tex., and Monroe, La., will construct a carbon black plant in the Saxet Oil Fields near Corpus Christi, Tex. Work will be done by day labor and separate contracts. H. J. Glaxon, Saxet Oil Fields, Corpus Christi, will be in charge of construction. Estimated cost $3,500,000.

Chemistry Building—Board Trustees Purdue University, West Lafayette, Ind., has awarded the contract for a 3 story, 52x110 ft. horticultural building and a 3 story, 41x126 ft. agricultural chemistry building, to W. J. Jungclaus Co., 825 Massachusetts Ave., Indianapolis. Estimated cost $152,351 and $136,700 respectively.

Coke Plant—Great Lakes Coal & Coke Co., 910 South Michigan Ave., Chicago, Ill., has awarded the contracts for a calcined petroleum coke plant at Lockport, Ill. Estimated cost $100,000.

Drug Factory — Bloch Drug Co., 130 Monticello Ave., Jersey City, N. J., has awarded the contract for the construction of a 3 story factory to Walter Kidde Constructors, Inc., 140 Cedar St., New York, N. Y. Estimated cost will exceed $40,000.

Factory—Eastman Kodak Co., Kodak Park, Rochester, N. Y., has awarded the contract for additions and improvements to its plant to Ridge Construction Corp., Kodak Park, Rochester, N. Y. Estimated cost will exceed $40,000.

Factory—Johns-Manville Co., 22 East 40th St., New York, N. Y., has awarded the contract for a factory at Watson, Calif., to Stone & Webster Engineering Co., 90 Broad St., New York, N. Y. Estimated cost $250,000.

Factory—National Gypsum Co., Buffalo, N. Y., has awarded the contract for the construction of a factory at Mobile, Ala., to H. K. Ferguson Co., Hanna Bldg., Cleveland, O. Estimated cost $1,000,000.

Factory—Prest-o-Lite Co., 30 East 42nd St., New York, N. Y., has awarded the contract for an addition to its factory at Springfield, Mass., to Fred T. Ley Co., 250 West 57th St., New York, N. Y. Estimated cost $40,000.

Factory—U. S. Plywood Co., Inc., 26 Lake St., Somerville, Mass., has awarded the contract for a factory and warehouse to W. A. Berry & Son, 6 School St., Danvers, Mass.

Glass Factory—Knox Glass Bottle Co., Knox, Pa., R. R. Underwood, Pres. & Mgr., will construct a 1 story addition to its glass bottle factory, also a 70x140 ft. mold shop. Steel contract has been awarded to Hooley & Collins, Kane, Pa., and rest of work will be done by owner. Estimated cost $100,000.

Glass Factory—Pittsburgh Plate Glass Co., 3849 Hamilton Ave., Cleveland, O., has awarded the contract for a factory building to Albert M. Higley, 2036 East 22nd St., Cleveland. Estimated cost will exceed $40,000.

Hydrogenation Plant—Hooker Electrochemical Co., Tideflats, Tacoma, Wash., has awarded the contract for a plant for hydrogenation of fatty oils, including installation of hydrogen compressors, converters, high pressure gas storage, etc., to Alan Porter Lee, 136 Liberty St., New York, N. Y. Estimated cost $100,000.

Laboratory—Don Baxter, Inc., 1505 Gardena St., Glendale, Calif., will construct a 1 and part 3 story laboratory building at Grandview Ave. and San Fernando Rd., Glendale. Work will be done by owner under supervision of E. P. Eiden, Engr., 106 East Wilson St., Glendale. Estimated cost $100,000.

Laboratory—City of Yonkers, City Hall, Yonkers, N. Y., has authorized a sale of bonds to cover cost of improvements and equipment of electrical and mechanical laboratories in Saunders Trade School. Work will be done by separate contracts. Estimated cost $40,000.

Laboratory—The House of Del-Van, Inc., 2339 Crescent Ave., Fort Wayne, Ind., is altering and rebuilding its cosmetics laboratory. Work is being done by separate contracts.

Laboratory — Division of Purchase and Traffic, Department of Agriculture, Washington, D. C., has awarded the contract for laboratory and shop buildings on 54 acre site overlooking the Potomac River on George Washington Memorial Highway at Abingdon, Va., to McCloskey Co., 1620 West Thompson St., Philadelphia, Pa., at $957,500.

Laboratory—Department of Public Works for Department of Mines & Resources, Ottawa, Ont., Can., awarded contract for industrial minerals and ceramics laboratory and ore dressing laboratory to A. I. Garvack, Sparks St., Ottawa, Ont. Estimated cost including fittings $129,289 and $86,280 respectively.

Laboratory—Boyton Realty Co., 16 Desbrosses St., New York, N. Y., has awarded the contract for a laboratory and plant building to be leased to Magnus, Mabee & Reynard, Inc., 32 Cliff St., New York, to Willton Construction Co., 157 Chambers St., New York, N. Y. Estimated cost will exceed $40,000.

Oxygen Factory—National Cylinder Gas Co., 4622 Este Ave., Cincinnati, Ohio, has awarded the contract for an oxygen manufacturing plant to Campbell, Lowrie & Lautermilch, 400 West Madison St., Chicago, Ill. Estimated cost $100,000.

Pulp Mill—Lake Sulphide Pulp Co., Ltd., c/o R. O. Sweenzey, 210 St. James St., W., Montreal, Que., Can., has awarded the contract for the construction of a pulp mill at Nipigon, Ont., to Barnett-McQueen, Fort William, Ont. Estimated cost $6,000,000.

Rubber Factory—Lower Rubber Co., 352 High St., Wadsworth, O., has awarded the contract for a factory at Ravenna, O., to P. L. Frank Construction Co., Ravenna. $40,000.

Storage Building — Monsanto Chemical Co., 1700 South Second St., St. Louis, Mo., has awarded the contract for a 1 story, 60x160 ft. storage building to Fruin-Colnon Contracting Co., 502 Merchants Laclede Bldg., St. Louis. Estimated cost $40,000.

Warehouse—Marathon Paper Co., Rothschild, Wis., has awarded the contract for a 1 story, 60x125 ft. warehouse to Permanent Construction Co., 735 North Water St., Milwaukee.

CHEMICAL INDUSTRY FAILS TO MAINTAIN GAINS RECORDED EARLY IN YEAR

WITH statistics now at hand covering operations in some of the important branches of the chemical industry, it is possible to form an estimate of the status of the industry as a whole for the first nine months as compared with that for the like period of last year. The totals for the three-quarter period indicate that both production and consumption of chemicals was on a higher scale this year.

Reviewing the statistics for the separate quarters, it is found that reports of a slowing up in business in the third quarter are verified by the statistics. In fact in many cases the percentage of total production for the nine months was highest in the first quarter of the year and has been declining since then.

The textile industry which is a large consumer of a varied line of chemicals made its best showing in the first quarter of this year. Consumption of cotton at textile mills shows a sharp decline in the third quarter and the same is true for silk. Furthermore, the outlook for the final quarter is not so promising as it was a year ago and the large gains recorded for the first part of this year undoubtedly will be considerably reduced by the end of the year.

The automotive industry made an excellent showing in the three-quarter period and the moving forward of the large automobile shows had a stimulating effect on car production in October. The volume of sales in the final quarter will be perhaps the most important factor in influencing the rate of general manufacturing activity in the Oct.-Dec. period.

The glass industry has been spotty with the container branch forging ahead steadily and making its best showing in the third quarter but a slowing up is reported for October. Plate glass opened the year with most of the producing plants closed by labor troubles. When production started in full swing, operations were speeded up and a record output for the year was in prospect until the fall in building operations and diminishing call from other outlets made their influence felt.

Rubber reclaiming also was on a rising line throughout the nine month interval and the larger output apparently has found a market as stocks are not unduly large compared with the carryover at the first of the year.

The output of crude methanol was fairly stable throughout the first half of this year with a moderate contraction in the third quarter. On the other hand, producers of synthetic methanol have adopted a progressive production schedule and, with the exception of June, each month this year has reported an output larger than in the preceding month. Total output for the three quarters was 20,831,842 gal. compared with 16,857,983 gal. for the corresponding period of 1936. Peak production is normally reached in the final quarter and it is only a question of by how much this year's production of synthetic methanol will surpass that of any preceding year.

Based on reports from 680 establishments, sales of paint, varnish and lacquer in the first three quarters of this year were valued at $340,858,094 as compared with $302,694,856 in the corresponding period of last year. The trend of these sales was upward for the first four months of the year with the peak reached in May. Then the curve turned downward through September with the total for that month slightly under that reported for September 1936. Sales in the final quarter of 1936 amounted to $95,347,914.

Summing up the situation, statistics demonstrate that manufacturing industries in general were on the upgrade from the beginning of the year through April and the curve turned downward and has since continued in that direction. The status of general industry was reflected in the volume of chemicals consumed and the chemical industry taken as a whole has followed the general trend and whereas in 1936 the industry opened on a comparatively lower scale and worked upwards, the reverse has been the case this year with the exception of certain branches which ran counter to the general trend.

CALENDAR

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS, Philadelphia, Pa., December 3 and 4.

16TH CHEMICAL EXPOSITION, Grand Central Palace, New York City, December 6-11.

INTERNATIONAL HEATING AND VENTILATING EXPOSITION, Grand Central Palace, New York City, January 24-28, 1938.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, annual meeting, New York City, February 21-24, 1938.

AMERICAN CERAMIC SOCIETY, New Orleans, La., March 27-April 2, 1938.

AMERICAN CHEMICAL SOCIETY, semi-annual meeting, Dallas, Texas, April 18-21, 1938.

ELECTROCHEMICAL SOCIETY, Savannah, Ga., April 27-30, 1938.

Activities in Chemical-Producing and Chemical-Consuming Industries for Nine Months, 1937 and 1936

	First quarter		Second quarter		Third quarter		Per cent of total: First quarter		Second quarter		Third quarter	
Production	1937	1936	1937	1936	1937	1936	1937	1936	1937	1936	1937	1936
Alcohol, ethyl, 1000 pr. gal.	56,162	40,229	52,415	42,106	52,540	52,398	34.8	29.9	32.6	31.3	32.6	38.8
Alcohol, denatured, 1000 wi. gal.	18,829	17,839	22,872	21,050	26,196	21,653	27.7	29.4	33.7	34.8	38.6	35.8
Automobiles, 1000	1,238	1,072	1,551	1,416	1,004	847	32.6	32.1	40.9	42.5	26.5	25.4
Byproduct coke, 1000 tons	12,844	9,722	12,855	10,930	13,419	11,431	32.8	30.3	32.9	34.1	34.3	35.6
Nitrocellulose plastics, 1000 lb.	5,485	3,775	4,855	3,887	4,429	4,475	37.1	31.1	32.9	32.0	30.0	36.9
Cellulose acetate plastics, 1000 lb.	3,744	2,251	3,693	3,263	3,457	3,368	34.4	25.3	33.9	36.7	31.7	38.0
Glass containers, 1000 gr.	12,117	9,500	14,376	11,312	14,785	12,241	29.3	28.7	34.8	34.3	35.9	37.0
Plate glass, 1000 sq. ft.	45,792	47,190	60,785	54,891	49,722	54,691	29.3	30.1	38.9	35.0	31.8	34.9
Methanol, crude, 1000 gal.	1,572	1,465	1,541	1,267	1,332	1,262	35.4	36.7	34.6	31.7	30.0	31.6
Methanol, synthetic, 1000 gal.	5,757	4,591	6,756	5,311	8,319	6,956	27.6	27.2	32.4	31.5	40.0	41.3
Pyroxylin spread, 1000 lb.	20,266	12,966	17,669	16,000	15,780	16,148	37.7	28.7	32.9	35.5	29.4	35.8
Rosin, wood, bbl.	179,635	156,175	187,569	160,267	200,188	171,512	33.1	32.0	32.8	32.8	34.1	35.2
Turpentine, wood, bbl.	28,533	26,362	28,685	25,391	30,752	25,886	32.4	34.0	32.6	32.7	35.0	33.3
Rubber reclaimed, tons	44,779	32,565	45,729	34,829	47,940	38,145	32.3	30.9	33.0	33.0	34.7	36.1
Vegetable oils, crude, 1000 lb.	783,648	704,370	504,491	400,555	597,176	484,565	41.6	44.3	26.8	25.2	31.6	30.5
Vegetable oils, refined, 1000 lb.	623,154	533,835	358,535	338,738	319,855	351,519	47.9	43.6	27.5	27.7	24.6	28.7
Consumption												
Cotton, 1000 bales	2,121	1,657	2,069	1,663	1,789	1,811	35.5	32.3	34.6	32.4	29.9	35.3
Silk, bales	122,616	107,048	111,622	98,088	101,328	124,383	36.6	32.5	33.2	29.8	30.2	37.7
Explosives, 1000 lb.	99,004	82,831	103,169	89,348	92,412	97,202	33.6	30.8	35.0	33.1	31.4	36.1
Rubber, tons	153,090	127,955	155,328	155,015	128,990	141,114	35.0	30.2	35.5	36.5	29.5	33.3
Vegetable oils, crude, 1000 lb.	908,058	862,721	751,256	696,658	684,611	738,384	41.0	37.6	30.9	30.3	28.1	32.1